

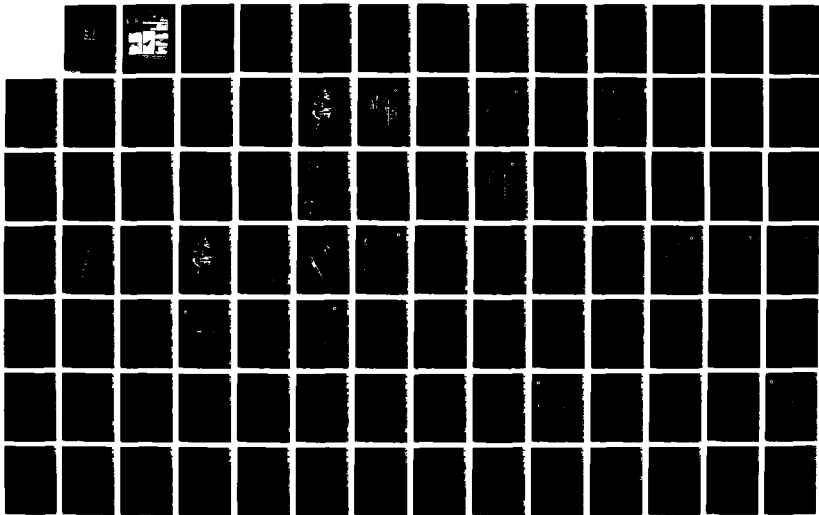
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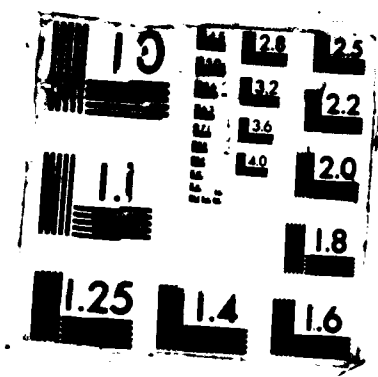
FINAL ENVIRONMENTAL IMPACT STATEMENT PEACEKEEPER IN  
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**PEACEKEEPER IN MINUTEMAN SILOS**  
**90th Strategic Missile Wing**  
**F.E. Warren Air Force Base**

## Volume 1

## January 1984

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## REPORT DOCUMENTATION PAGE

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<p>This Final EIS (FEIS), Volume I, addresses the placement of Peacekeeper Intercontinental Ballistic Missiles (ICBMs) in refurbished Minuteman III silos at F E Warren AFB, Wyoming. This FEIS describes potential environmental changes to the following environmental resources: employment demand, housing, public finance, construction resources, social well-being, public services and facilities, utilities, energy resources, transportation, land use, recreation, cultural resources, visual resources, water resources, biological resources, threatened and endangered species, geologic resources, noise, and air quality.</p> <p>Approved for release by NSA on 09-10-2013 pursuant to E.O. 13526</p>					
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PEACEKEEPER IN MINUTEMAN SILOS  
FINAL ENVIRONMENTAL IMPACT STATEMENT

JANUARY 1984

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## **Cover Sheet**

- (a) Responsible Agency: United States Air Force.**
- (b) Proposed Action: Deployment of Peacekeeper Missiles in Minuteman Silos in Wyoming and Nebraska.**
- (c) Designation: Final Environmental Impact Statement (FEIS).**
- (d) Abstract: The President has directed that the Air Force deploy the Peacekeeper missile system at a location near F.E. Warren Air Force Base (hereafter F.E. Warren AFB), close to Cheyenne, Wyoming. The Peacekeeper (formerly called the M-X) is an advanced, land-based intercontinental ballistic missile which will become part of the U.S. strategic nuclear deterrent force. The plan calls for the replacement of 100 existing Minuteman III missiles with 100 Peacekeeper missiles using existing Minuteman III silos. Missile replacement will occur within the 319th and 400th Strategic Missile Squadrons located near F.E. Warren AFB. Construction activities associated with Peacekeeper deployment will occur between 1984 and 1989.**

This FEIS is based on a special Congressional action (the Jackson Amendment described in Section 1.3) that has exempted the selection of the basing mode and location of the action from the National Environmental Policy Act. Accordingly, no other system alternatives are analyzed in this FEIS. The impacts of the Proposed Action are analyzed and appropriate mitigation measures are identified. The No Action Alternative serves as the baseline against which project impacts are judged. This FEIS analyzes project element alternatives of the Proposed Action. These alternatives include transportation routes at F.E. Warren AFB, additional buried cables connecting the two missile squadrons, and dispatch stations.

This FEIS describes potential environmental changes to the following environmental resources: employment demand, housing, public finance, construction resources, social well-being, public services and facilities, utilities, energy resources, transportation, land use, recreation, cultural resources, visual resources, water resources, biological resources, threatened and endangered species, geologic resources, noise, and air quality.

## PREFACE

Since publication of the Draft Environmental Impact Statement (DEIS), some modifications to the system description have occurred. Modifications to the DEIS have also been developed to respond to public comments.

Project modifications necessitating some reanalysis include reducing the number of construction workers required, adding two and removing one buried cable paths, adding two options for upgrading the Defense Access Roads, modifying a proposed roadway alignment on F.E. Warren AFB, and adding a proposed dispatch center (previously identified as "staging areas" in the DEIS) in Chugwater and removing one in Cheyenne for the purpose of the analysis.

During the public review and comment period over 400 documents, including public hearing testimony, were received. A total of 1,488 different issues was identified within the comments received from agencies, organizations, and individuals. Volume 2 of the Final Environmental Impact Statement (FEIS) is devoted to treatment of these comments, but a few are summarized here.

A number of comments concerning the scope of the FEIS are addressed in an expansion of Section 1.3. Three of the issues identified, alternative deployment methods, other defense systems, and the impact of nuclear war, are beyond the scope of this FEIS. Another concern was the adequacy of the DEIS as it relates to the requirements of the National Environmental Policy Act. Section 1.6.10 now includes a more detailed analysis of safety issues regarding Quantity Distance zones, the Wheatland-Whalen Fault Zone, transportation, and operation of the Peacekeeper system.

Employment created by the project and the resulting immigration to communities in the study area generated many concerns. The number of project-induced immigrants has been revised downward due to changes since the DEIS. Baseline population forecasts have changed to conform to recent states of Wyoming and Nebraska forecasts. Additionally, forecasts of the projected level of economic activity within the region have declined. A somewhat lower project workforce is also forecasted. These factors combine to result in a lower projected number of immigrants to the area along with a corresponding reduction in impact to a number of environmental resources.

Comments were received which addressed public services and facilities. Issues most frequently raised concerned the ability of communities to meet increased demand placed on human services, educational facilities, and law enforcement agencies. These comments resulted in a verification of data, more detailed analyses, and an examination of the impacts on public services. Water and wastewater facilities in the South Cheyenne area were also of major concern. Methods of utilities assessment were carefully reviewed. Some data adjustments and methodology refinements for the final analysis were made.

Impacts on transportation and on residents living near routes to be used during project deployment and operation were concerns identified in the public comments. Additional analyses on these issues were conducted in preparation of the FEIS and appropriate mitigation measures have been provided.

A number of respondents expressed concern about the impacts to agricultural practices and lands. This issue was reanalyzed and new data was incorporated in a rural land use section. A reanalysis of recreation facilities was conducted and more detailed information has been provided to address a number of issues concerning neighborhood parklands and the use of regional recreational facilities.

A number of comments addressed the issue of increased water demand and the resulting impacts to local water supply. Additional analyses were conducted and data were verified from several sources. The acquisition of water rights by the Air Force was another major issue. The impact from increased noise levels and dust generated from project traffic was questioned in a number of comments.

The potential impacts to biological and cultural resources on F.E. Warren AFB were addressed in several public comments. Since publication of the DEIS, road alternatives on F.E. Warren AFB have been modified to minimize impacts to the Colorado butterfly plant. Additionally, a Biological Assessment, in compliance with Section 7.0 of the Endangered Species Act, and a Biological Study Plan have been prepared to provide additional guidelines for the protection of potentially impacted species. Additional archaeological inventory and evaluation occurred on F.E. Warren AFB increasing onbase recorded sites from 12 to 37. These primary data allowed validation of mapped data and other data from secondary sources. The section addressing cultural and paleontological resources includes more detail to address the comments concerning surveys and consultation with American Indian groups.

Project changes and issues raised by the public required some changes in the analyses and conclusions since publication of the Draft Environmental Impact Statement (DEIS). Major changes are identified in Section 3.0 of the Final Environmental Impact Statement (FEIS). Examples of some of these changes are: housing impacts were lowered because a reduced number of workers are required to immigrate and the project-induced population was reallocated; the regional transportation impact was changed to significant because of additional traffic delays due to the greater extent of road modifications anticipated; the realignment of a proposed new road at F.E. Warren AFB and the timely implementation of certain mitigation measures resulted in a reduction in impact for endangered species; and, for cultural resources, the short-term impacts have been changed to significant because operational requirements may necessitate modifications which are not in conformance with historic preservation requirements for some buildings at F.E. Warren AFB.

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## EXECUTIVE SUMMARY

### PROJECT PURPOSE

The Air Force plans to deploy the Peacekeeper Missile system within the 90th Strategic Missile Wing at F.E. Warren Air Force Base (AFB) near Cheyenne, Wyoming. The Peacekeeper system is an advanced, land-based intercontinental ballistic missile system designed to improve the nation's strategic deterrent force. Land-based strategic missiles are an integral part of the United States nuclear deterrence strategy. Air, sea, and land-based weapons form a TRIAD of strategic forces, each with different capabilities and advantages to complicate Soviet offensive and defensive planning. The TRIAD also provides a hedge against technical problems that could temporarily disable a system and against technological breakthroughs or a rapid evolution of threats that might erode the survivability of one or more parts of our strategic forces.

The Scowcroft Commission was established by the President in January 1983 to study the nation's strategic modernization needs. The Commission concluded that the advantages of the land-based portion of the TRIAD (i.e., low maintenance costs, high reliability, rapid response, and great accuracy) in addition to its contribution to the effectiveness of the TRIAD, make it imperative that the land-based missile system be upgraded to address the challenges posed by the Soviet Union. As part of their recommendation on upgrading, the Commission urged deployment of 100 Peacekeeper missiles as an immediate measure to modernize the land-based missile system. The President, following review of the Scowcroft Commission report, decided on deployment of 100 Peacekeeper missiles in specific existing silos supported by F.E. Warren AFB and provided this decision in his report to Congress.

The Jackson Amendment to the 1983 Defense Appropriations Act (Public Law 97-377) exempted the President's report and proposals from the requirements of the National Environmental Policy Act. The 1984 Defense Authorization Act authorized the Air Force to procure Peacekeeper missiles and directed that they be deployed in existing Minuteman missile silos in the 319th and 400th Strategic Missile Squadrons at F.E. Warren AFB.

The purpose of the Final Environmental Impact Statement (FEIS) is to analyze the impacts of implementing actions and their alternatives, and to develop appropriate mitigation measures.

### PROJECT DESCRIPTION

The Peacekeeper deployment plan calls for the replacement of 100 of the existing Minuteman III missiles with 100 Peacekeeper missiles. Existing missile Launch Facilities will be used with modifications (Figure S-1). Modifications to the Launch Control Centers will primarily involve electronic equipment. Missile replacement will occur within the two squadrons located nearest F.E. Warren AFB, the 319th and the 400th Strategic Missile Squadrons (Figure S-2). Five additional buried cables will be laid to link Squadrons 319 and 400. In addition, a number of support facilities will be constructed or altered at F.E. Warren AFB which currently serves as the Strategic Missile Support Base (referred to in this document as the Operating Base) for the 90th Strategic Missile Wing. Defense Access Roads will be upgraded as required to transport Peacekeeper stages from F.E. Warren AFB to the Deployment Area. The Peacekeeper missile system is scheduled to achieve initial operational capability in December 1986 and to be fully operational by late 1989. Construction at F.E. Warren AFB will occur between 1984 and 1986. Work in the Deployment Area will occur from 1985 to 1989.

Operations of the Peacekeeper system will be similar to the Minuteman system. The major differences are in the transport and emplacement of the missile. The Minuteman stages are transported fully assembled and emplaced in the silo with the same vehicle. Peacekeeper

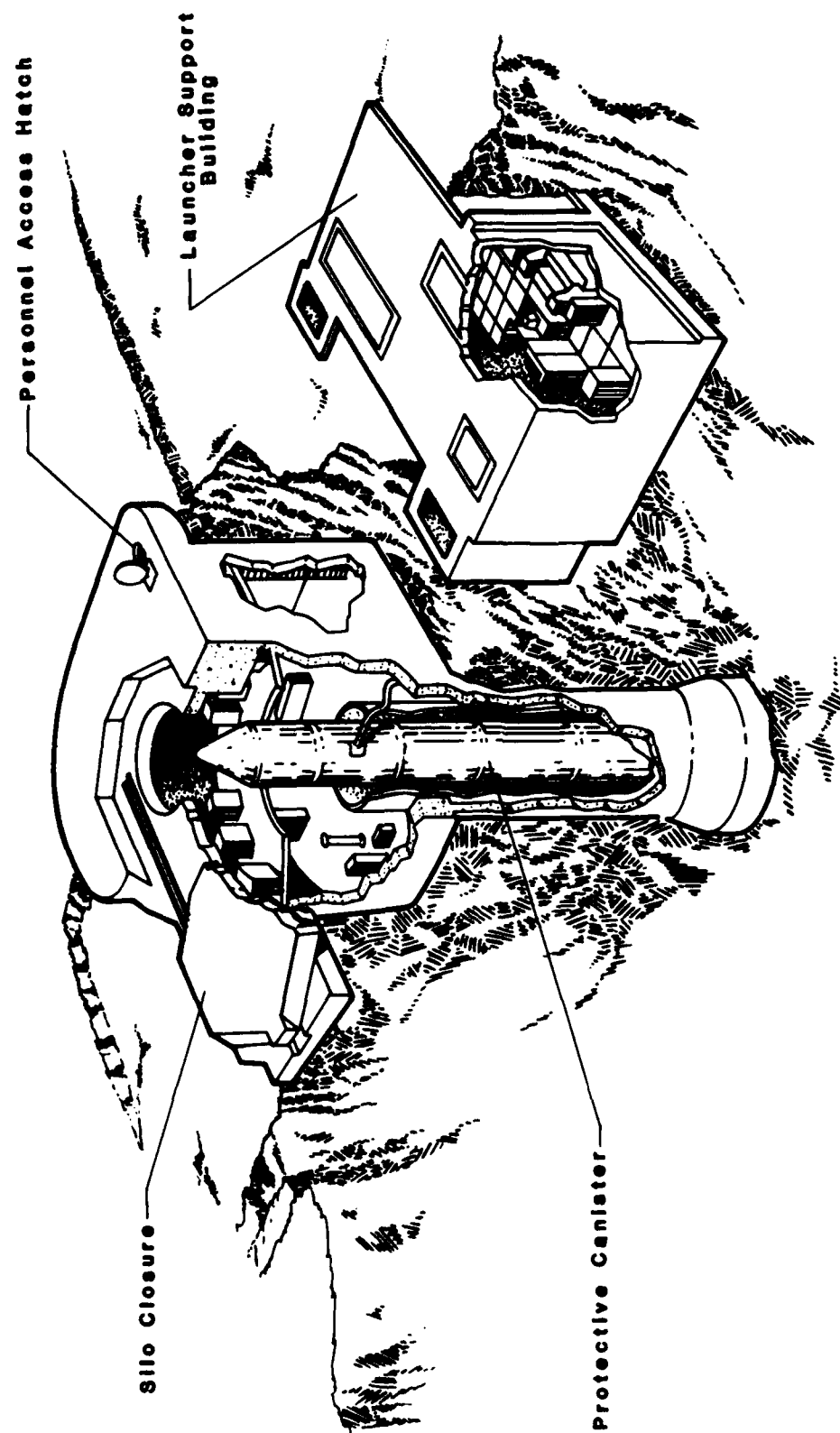


FIGURE S-1 PEACEKEEPER LAUNCH FACILITY

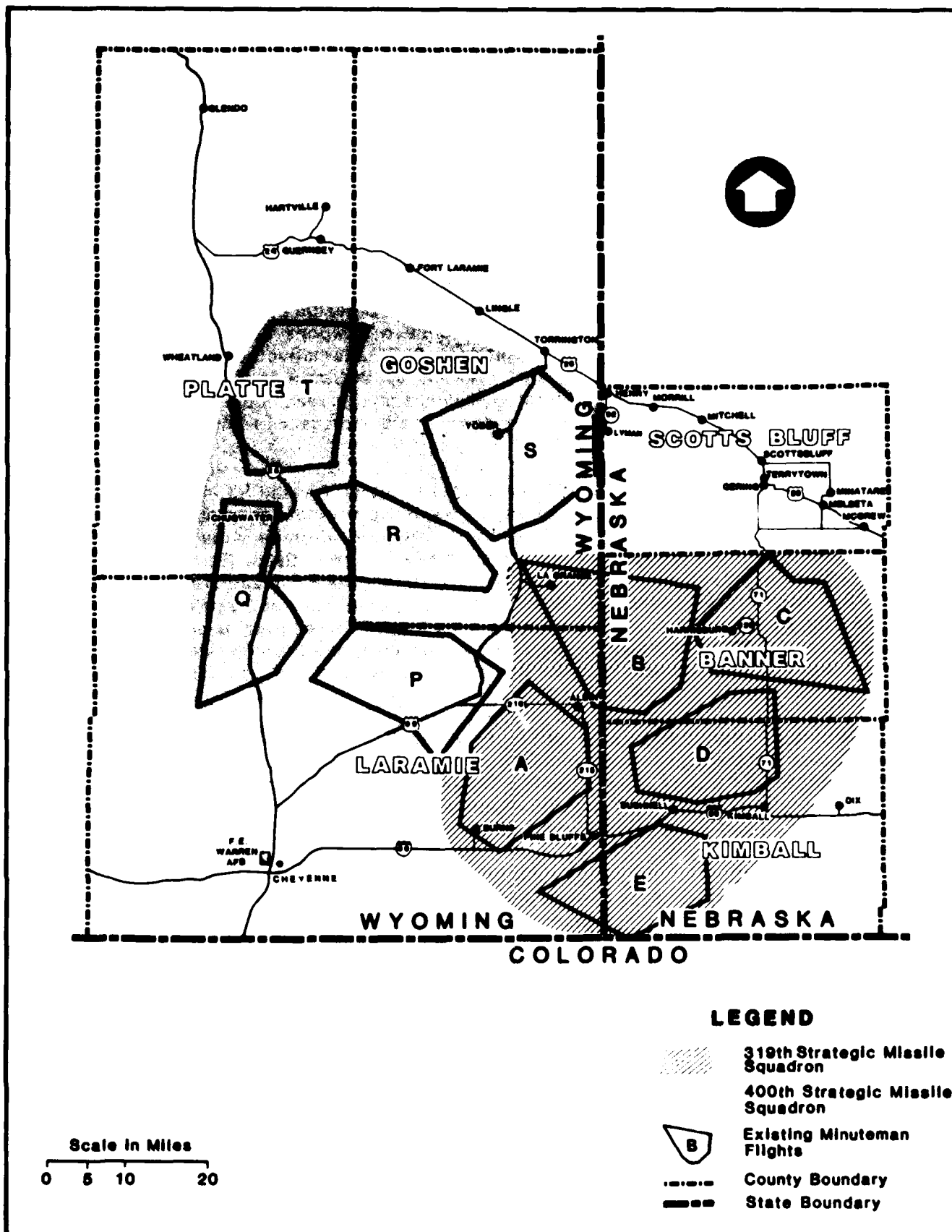


FIGURE S-2 PEACEKEEPER DEPLOYMENT AREA

stages will be transported individually by one vehicle, and emplaced in the silo by another vehicle. Once fully operational, security and maintenance operations in the Deployment Area will be similar to those now in effect for the Minuteman system.

Total direct manpower will peak during 1986 when an average of nearly 1,600 persons will be required. In 1990, following deployment, the increase in operational workforce at F.E. Warren AFB will consist of about 475 persons.

#### PROJECT-ELEMENT ALTERNATIVES

Within this framework the FEIS addresses alternatives for several system elements. These are: 1) three alternative road configurations, each with several design options, for linking the new onbase Stage Storage Area with the existing onbase Weapons Storage Area, as well as achieving access offbase to the Deployment Area; 2) 11 alternative buried cable paths from which five would be selected, linking the 319th and 400th Strategic Missile Squadrons; and 3) three dispatch station alternatives formerly called staging areas in the Draft Environmental Impact Statement (DEIS) for providing temporary field storage and administrative centers during the project.

Three alternative roadway configurations (referred to as R1, R2, and R3 in Figure S-3) were developed for F.E. Warren AFB. As described below, these alternatives offer varying means of access from the Stage Storage Area and the Weapons Storage Area to roads in the Deployment Area. R1 provides access to Interstate 25 from Gates No. 5 and 2. R2 (the proposed action) provides the same access to Interstate 25 as R1. In addition, R2 provides for an onbase connection between the Weapons Storage Area and the Stage Storage Area. R3 provides the same access to Interstate 25 from the Stage Storage Area as provided in R1 and R2. R3 provides the same connection between the Weapons Storage Area and the Stage Storage Area as R2. In addition, R3 is the only alternative which provides for a connection from the Weapons Storage Area to Interstate 80.

For each of the 11 buried cable alternatives (from which five would be chosen) a 1-mile wide path has been analyzed. For cable installation, a specific 35-foot wide temporary easement would be obtained for only 5 paths to install the cable. Following cable burial the permanent easement width will be 16.5 feet. The cable depth will be approximately three feet. Total buried length for all five cables will range from approximately 80 to 110 miles, depending upon final route selections.

Deployment contractors may be expected to establish up to two dispatch stations consisting of sites for temporary, open storage of equipment and material. Several small portable buildings will also be present at each site for contractor use. In the Proposed Action, two temporary dispatch stations would be established, one each in the northern and eastern portions of the Deployment Area. For purposes of analysis representative locations are Chugwater, Wyoming and Kimball, Nebraska. Two alternatives exist: 1) a single dispatch station in the eastern portion of the Deployment Area, and 2) no dispatch stations.

#### ENVIRONMENTAL CONSEQUENCES OF THE PROJECT

##### General Approach to Impact Assessment

Project-related impacts are measured by the change caused by the project, as compared to the No Action Alternative, on each of 18 environmental resources.

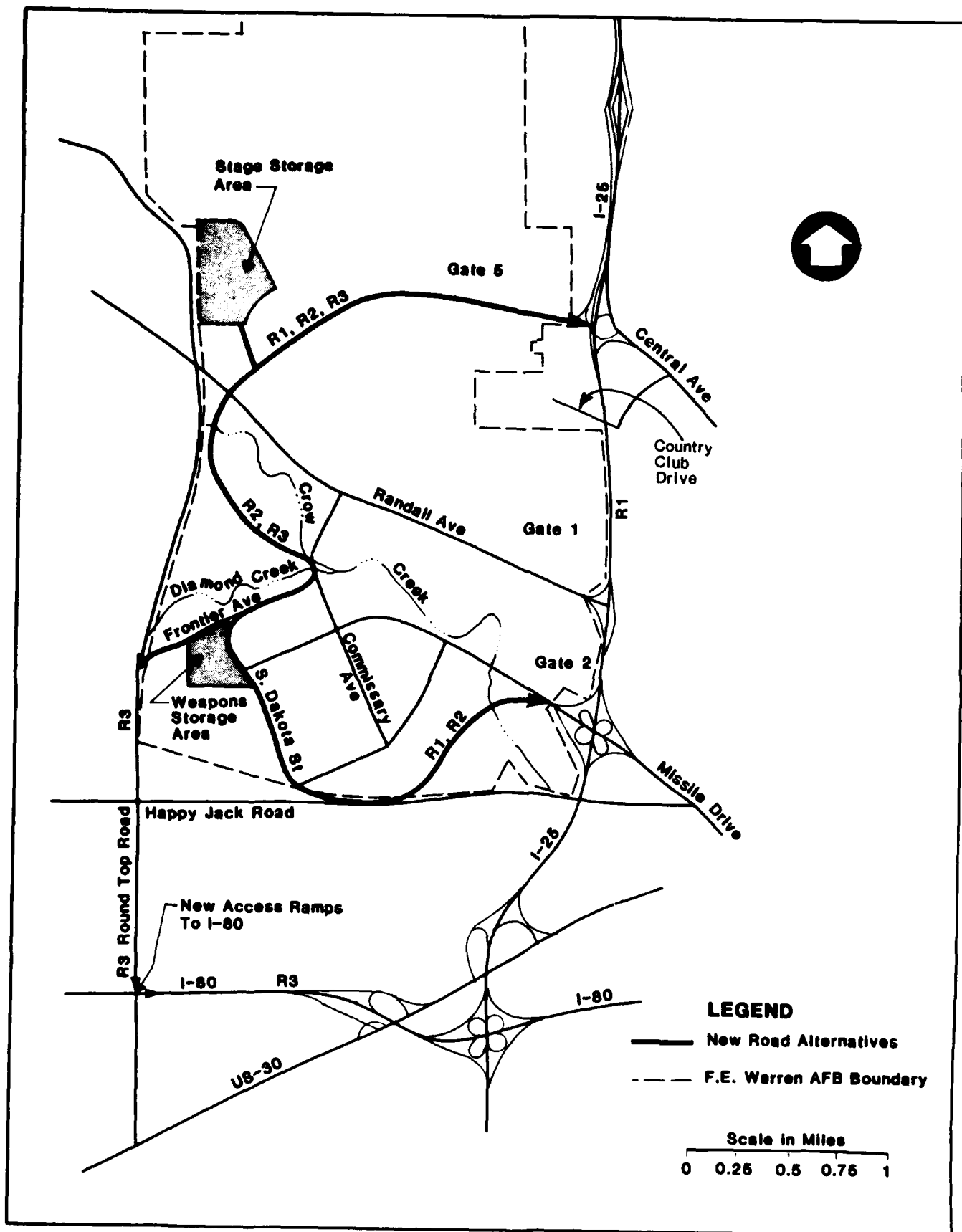


FIGURE S-3 ROADWAY ALTERNATIVES AT F.E. WARREN AFB

Two measures of impact are used in this document: level of impact and significance. Level of impact is a measure of environmental change resulting from the project as compared to the projected baseline (No Action Alternative). Four impact levels are used throughout the impact analysis: negligible, low, moderate, and high. A negligible impact indicates that the environmental resource being analyzed will receive either no impact or a very small impact due to the proposed project. In contrast, a high level of impact indicates that the proposed project will result in an extensive alteration in the availability or the quality of the environmental resource. Specific definitions of these levels of impact vary by environmental resource.

The term significant is used as a measure of the importance of the impact, and does not necessarily imply a separate judgment on the overall severity of the impact. Rather, it may indicate a judgment regarding which impacts warrant heightened attention, by the Air Force or others, during project planning; or it may reflect a judgment as to the extent of the action necessary to avoid that impact. The criteria used to evaluate significance have been derived for each resource.

Two additional aspects of impact assessment have also been analyzed. First, an impact is assigned to one of three geographical levels: site (where direct project activities occur), local (within a city jurisdiction or district surrounding an impacted area), and regional (within the Region of Influence defined for each environmental resource).

Second, an impact may be categorized as short or long term, according to when it occurs. Short-term impacts will occur during construction (before 1990). Long-term impacts will occur during operation (after 1990) and reflect impacts which are generated during the operational period or which continue from the construction period. The operational impacts assessed for each resource would continue to be realized at the same level of impact for the foreseeable future.

To the extent practical in consideration of operational requirements, schedule, and budget, the Air Force has committed to implementing standard construction practices and other measures that help to reduce the environmental impact of the Proposed Action and project-element alternatives. These measures have been taken into account in the impact analyses of the project.








The conclusions drawn in the FEIS are based upon data and detailed analysis contained in the FEIS and in 13 companion environmental planning technical reports. The volumes are available for review at local libraries.

## PROJECT IMPACTS

This section summarizes, by resource category, the major impacts of the Proposed Action. Figure S-4 graphically depicts the impacts. In the impact summary matrix, adverse impacts are identified with various sized circles and are blackened if significant. If effects may also be beneficial, a dot pattern is included in the matrix cell. In some cases, there are both adverse impacts and beneficial effects for the same resource. Where impacts were judged not to be significant for a resource or an element of a resource, the discussion of impacts is minimized.

### Employment Demand

Employment demand describes the available regional labor force which may be used by the project, and the demand for nonlocal labor which will result in the immigration of workers, job-seekers, and their families.

LEGEND		ADVERSE IMPACTS	SIGNIFICANT ADVERSE IMPACTS
LEVEL OF IMPACT*	LOW		
	MODERATE		
	HIGH		
POTENTIAL BENEFICIAL EFFECTS			
* MEASURE OF THE AMOUNT OF ENVIRONMENTAL CHANGE			

	PROPOSED ACTION					
	SHORT TERM			LONG TERM		
	SITE	LOCAL	REGIONAL	SITE	LOCAL	REGIONAL
Employment Demand		■	■		■	
Housing		○				
Public Finance		●				
Construction Resources		■	■			
Social Well-Being		○			■	
Public Services and Facilities		●			○	
Utilities		●				
Energy Resources		○			○	
Transportation	●	●	●	■	■	■
Land Use	○	○		○	○	
Recreation		●	●		○	○
Cultural and Paleontological Resources	●			●		
Visual Resources	○					
Water Resources	○	●	○	○	○	○
Biological Resources	●		●	●		
Threatened and Endangered Species	●		●	●		
Geological Resources	○	○			○	
Noise						
Air Quality		○				

Note: Adverse impacts are identified with various sized circles and are blackened if significant. If there are also beneficial effects, a dot pattern is included. In some cases, there are both adverse impacts and beneficial effects for the same resource.

FIGURE S-4 SUMMARY OF PROPOSED ACTION IMPACTS

The project is forecast to create about 1,600 direct and 1,100 indirect jobs in the region in the peak years with about 55 percent of the jobs filled by people presently residing in the local area. Analysis indicates these jobs will cause a total maximum immigration of 3,200 persons in 1987, with over 80 percent immigrating to the Cheyenne Urban Area (which has a current population of about 65,000). Immigration is also forecast during project construction for Chugwater, Pine Bluffs, Wheatland, and Torrington in Wyoming, and for Kimball and the Gering-Scottsbluff area in Nebraska. The project and resulting immigration will result in increased employment and income, and in decreased unemployment, producing a beneficial effect in these communities.

No adverse impacts are forecast due to changes in employment.

### Housing

Housing includes the existing housing stock (single family, multifamily, mobile homes, and temporary housing accommodations) and the capability of the private housing industry to respond to changes in housing demand.

Analysis indicates a peak-year net demand for about 310 single family, 210 multifamily, and 210 mobile homes in the Cheyenne Urban Area. No shortage of temporary accommodations is forecast except perhaps during Cheyenne Frontier Days. Peak-year multifamily demands are also generated in Pine Bluffs and in Wheatland. Peak-year mobile home demand would occur in Pine Bluffs, Chugwater, and Kimball. Increased utilization of the existing housing stock and increased housing stock due to the project will be beneficial.

Even though overall impacts on housing are rated as beneficial, significant impacts could occur during the construction period on mobile homes in Cheyenne and on multifamily units in Wheatland due to potential price instability. Some excess supply of housing could cause long-term impacts in Pine Bluffs and Kimball.

No significant housing impacts are forecast for Pine Bluffs, Chugwater, or Kimball in the short-term.

### Public Finance

Public finance describes the budgets, fiscal resources, and obligations of all major governmental entities, including school districts and urban service areas.

Analysis for the 16 such entities potentially impacted by the project indicate total revenue due to the project in the 1984 to 1992 period will increase by \$32.3 million while expenses due to the project will increase by \$28.3 million thus providing a beneficial effect. However, some entities will have expenses exceeding revenues.

The analysis indicates that there will be an overall moderate and significant impact in the short-term due to concentration of fiscal burden within Laramie County, Wyoming. Laramie County School District No. 1 would experience about a \$6.7 million revenue shortfall due to the need for additional staff and space.

Although generally not significant, some entities will have expenses that exceed revenues which lead to low or moderate impacts. This is due to reduced cash balances, the need to raise fees or tax rates, or reduce expenditures to a level lower than previously planned.



### Construction Resources

Construction resources describe the construction materials market for cement, coarse and fine aggregate, ballast, asphalt, roofing, lumber, concrete block and brick, and other project-related materials of local importance.

Project demands for these resources are about 6,400 tons of cement, 4.6 million tons of aggregate, 2,800 tons of ballast, 111,000 tons of asphalt, 1 million square feet (sq ft) of roofing, 485,000 board feet of lumber, 134,000 concrete blocks and bricks, and 7,720 tons of steel products and several specialty material resource items related to buildings on F.E. Warren AFB. Increased utilization of production facilities and increased sales will produce beneficial effects for each construction material type.

The analysis indicates no significant adverse impacts resulting from the project on overall construction resources. Potentially significant adverse impacts could occur in aggregate and asphalt supplies due to projected use of 50 and 12 percent, respectively, of the regional production capacity which could interfere with other users.

### Social Well-Being

Social well-being is an assessment of the social well-being of area residents developed from information on local issues, opinions, and selected indicators of behavior.

Although no large scale alterations to the existing social structure in Laramie, Platte, and Kimball counties are anticipated as a result of the project, some increase in existing social and economic-related problems are expected. Improvements in the area economy along with increased cultural diversity are expected to be generally beneficial to the well-being of the respective communities.

Overall, impacts on social well-being are rated low and not significant during project construction. However, social problems of alcohol and substance abuse, transients, and social conflict associated with population growth could increase and cause moderate and significant impacts in some communities. Some impacts could also occur from potential relocation of residents of the nine homes within the Quantity Distance zones near Launch Facilities.

No long-term adverse impacts are forecast for the resource as a whole.

### Public Services

Public services are those services provided by governmental and other authorized agencies to meet the health, safety, and welfare needs of citizens. Included in this category are education, law enforcement, the justice system, fire protection, health care, human services, general government, and libraries.

The public services analysis examines needs for additional staffing, capital equipment, or capital facilities in order to maintain service levels at existing conditions or to meet certain standards of service.

Overall, public services will experience a moderate and significant impact due to the project. The analysis indicates that only education, human services, and law enforcement would experience significant adverse impacts during the construction period.

Within education, the primary impacts are projected for Laramie County School District No. 1. The additional staffing requirements in the peak year due to the Proposed Action would be 33 teachers and 25 other staff, while the additional space requirement would be 40,260 sq ft during the peak year. Due to the sizable square footage requirement, the District's level of impact is rated high. Other school districts will have much smaller staffing and space needs due to the project.

Human service agencies in Laramie County found to have moderate, significant impacts include the Alcohol Receiving Center Halfway House, the Cooperative Ministries for Emergency Assistance (COMEA) shelter, Salvation Army, and the Southeast Wyoming Mental Health Center. Additional staffing may be required due to the potential for disproportional demand for alcohol and mental health services and due to an increased number of unsuccessful job-seekers requiring support from the COMEA shelter and Salvation Army. Additional staffing required for each of these agencies would range from one to four individuals.

The law enforcement agencies of Laramie County and the City of Cheyenne are projected to require additional staffing in order to maintain levels of service. In the peak year additional staffing requirements are projected to be five sworn officers and two civilian staff for the County Sheriff's Department and six sworn officers and one civilian staff for the City Police Department.

No significant adverse impacts due to the project are forecast for the justice system, fire protection, health care, general government, or libraries.

#### Utilities

Utilities describes water treatment and distribution systems, wastewater systems, solid waste systems, stormwater facilities, and telephone service.

The utilities analysis examines needs for added staffing, capital equipment, or capital facilities to meet forecast demands. Cheyenne is the only community identified that will have to upgrade its utilities to serve project needs. Induced population will result in a 3 to 4-percent increase in peak water demand and in wastewater flow and solid waste generation. New development results in the need for about 1 mile of stormwater pipe. New equipment to handle local solid waste and telephone service will be needed. Although other communities may experience peak increases in utility demands of up to 10 percent, no additional facility expansions are needed to meet these demands.

The overall impact on utilities is rated low and significant during project construction. Wastewater systems in the Cheyenne Urban Area will receive low but significant impacts from the project due to increased wastewater flow induced by the proposed project which will aggravate the problem of currently overloaded waste treatment facilities.

No significant adverse impacts due to the project are forecast for water treatment and distribution systems, solid waste systems, stormwater facilities, or telephone service.

#### Energy Resources

Energy resources include the supply and distribution systems for electrical power, natural gas, petroleum products and coal.

Consumption of these resources will increase by 1 to 6 percent over baseline for communities receiving immigration population. No new energy facilities will be needed as a result. Operation increases in electrical, coal, and fuel use will occur at F.E. Warren AFB, but new facilities are only required to meet the electrical needs. Peak electrical demand will increase at the Launch Facilities during system operation, but will not exceed the local line capacity.

Analysis indicates that supplying these energy needs will result in no significant adverse impacts for energy resources as a whole or for individual types of energy.

### Transportation

Transportation describes the various modes of travel used for the movement of persons and goods, and includes transportation planning, design, and operation of roads, railroads, aviation facilities, public transit, pedestrian and bicycle facilities, and the interrelationships between these travel modes.

The analysis examines the impacts of increased use of these modes in urban areas as well as rural areas. The project would involve upgrade of several hundred miles of roads in the Deployment Area resulting in a long-term beneficial effect for the region.

Significant impacts on the transportation resource are expected due to short-term reductions in level of service at some intersections and interchanges in Cheyenne. Additionally, traffic delays and inconvenience resulting from upgrades in the Deployment Area will generate significant impacts. However, the project-related improvements to designated roads will provide greater safety and level of service for the area.

No significant adverse impacts are expected for railroads, aviation facilities, public transit, or pedestrian and bicycle facilities.

### Land Use

Land use comprises both urban land uses in developed communities where population immigration is expected, and rural land use and agriculture in the Deployment Area where direct and indirect impacts from project development will occur.

The project would create a need to develop 167 acres of vacant land in Cheyenne, 16 acres in Wheatland, 10 acres in Kimball, 9 acres in Pine Bluffs, and 3 acres in Chugwater for residential and support services. There is the potential for underutilization of project-related developed land in all communities except Chugwater during the project's decline cycle. In Cheyenne, a potential beneficial effect could occur as a result of using existing vacant lots. Up to 510 acres of rural land in agriculture will be affected by cable installation. In addition, nine homes occur within proposed Quantity Distance zones around Launch Facilities. Some interference with agricultural operations could occur due to interference with access to fields during road modifications.

Overall impacts to agriculture, rural land use, and urban land use are not significant.

### Recreation

Recreation includes regional recreation which is related to federal, state, and other lands offering outdoor recreation opportunities and local recreation which is related to municipal and county-owned parks and facilities within urbanized areas.

Regional recreation demands will increase for specific facilities. Some facilities may suffer impairment during peak-use periods because they are presently near capacity. In some cases, additional law enforcement and management measures may be required to ensure public safety. On a local level, demand will create the need for an additional 16 acres of parkland in Cheyenne, as well as additional staff and other recreational facilities.

The overall impact on recreation is moderate and significant during the construction period. The recreation analysis indicates Medicine Bow National Forest and Glendo, Guernsey, and Curt Gowdy state parks could be overcrowded resulting in some deterioration of the quality of the recreational experience and an increased requirement for law enforcement. Moderate and significant impacts during the construction phase will occur on local facilities due to an increased demand for parkland, facilities, and staffing. This impact is due to immigration and the absence of developed parkland in some neighborhoods in the Cheyenne Urban Area.

No significant long-term impacts are projected.

#### Cultural and Paleontological Resources

Cultural and paleontological resources include four major elements: prehistoric, historic, American Indian cultural resources, and paleontological resources.

Impacts are generally associated with ground disturbance or potential alteration of above-ground structures. Impacts to prehistoric and historic archaeological properties will result from the construction of new roads and utilities at F.E. Warren AFB, placement of buried cables in the Deployment Area, and widening and upgrading of Defense Access Roads. Historic architectural resources will also be impacted by the modification of existing buildings which lie within the Historic District at F.E. Warren AFB. However, it is expected that implementation of Air Force committed mitigation measures and continued use of these buildings will result in net beneficial effects to those onbase historic buildings that are scheduled to receive project modifications.

Overall, the impact upon cultural resources will be moderate and significant. This is due to the modification of buildings in the Historic District.

The prehistoric cultural resources analysis indicates that there will be no significant adverse impacts with advance planning to avoid or ameliorate loss of important archaeological sites.

The paleontological and American Indian cultural resources analyses indicate that there will be no significant adverse impacts resulting from the project.

#### Visual Resources

Visual resources include scenic resources and the visual environment, as well as evaluation of the visual quality of the region.

Impacts are generally associated with temporary land clearing.

The visual resources analysis indicates that there will be no significant adverse impacts resulting from the project.

#### Water Resources

The water resources analysis examined water use and demands, constraints on water use, and groundwater and surface water hydrology and quality.

Water use and demand due to the project will increase by a relatively small cumulative total of about 4,000 acre-feet over the entire 1984 to 1990 construction period and about 250 acre-feet per year from 1991 on as a result of the project. About 72 percent of the construction-period demand and all of the operating demand will occur in the Cheyenne Urban Area. In addition, increased development in the Cheyenne Urban Area will increase storm runoff and flood flows and related erosion and sedimentation.

The overall water resources impact has been rated as moderate and significant in the short-term due to project-related changes in the Cheyenne Urban Area with water use potentially interfering with other users, storm runoff in some areas potentially affecting public safety, and erosion causing some water quality degradation.

No project-related activities are expected to cause significant water resources impacts in the Deployment Area or on F.E. Warren AFB since water use is small and the Air Force will follow state water laws in water acquisition and follow standard construction practices to control storm runoff and erosion from project activities.

### **Biological Resources**

Biological resources include vegetation, wildlife, fisheries, and unique and sensitive habitats.

The biological analysis assessed the impact of ground disturbance activities as well as population-generated changes to these resources. Direct impacts on biological resources include loss of vegetation and wildlife habitat, loss of fisheries habitat, disturbances to big game and raptors, and increased siltation in area streams. Indirect impacts include increases in hunting and fishing pressures, game and fish pressures, game and fish violations, and recreation pressure.

The overall impact level of the proposed project on biological resources will be moderate and significant during project construction largely as a result of the unique character of the vegetation types affected at F.E. Warren AFB and the value of affected riparian/wetland vegetation as wildlife habitat in the Deployment Area. Additionally, the slow recovery periods for these vegetation types generates low long-term impacts. Impacts, however, for the majority of individual wildlife and vegetation types range from negligible to low.

Nonsignificant project-related impacts include the loss of small amounts of short-grass prairie vegetation; small losses of furbearer, upland game, waterfowl, nongame mammal, and reptile and amphibian habitat; and increases in hunting and fishing pressure.

### **Threatened and Endangered Species**

This category includes plants, wildlife, and aquatic species which are protected by federal law as threatened or endangered. Also included in this category are state-protected rare, threatened, or endangered species.

Within the project area, there are three federally listed species on the threatened and endangered list: the black-footed ferret (in prairie dog towns), the greenback cutthroat trout, and the bald eagle. With implementation of appropriate assumed mitigations, impacts on the habitat of the black-footed ferret located in the project area will be negligible. The expected minor increase in fishing pressure in the greenback cutthroat trout habitat is expected to have a negligible impact on the species. Increases in random shooting of raptors during the construction period will result in a low and significant impact on the bald eagle.

The Colorado butterfly plant, although not formally federally listed, is categorized by the U.S. Fish and Wildlife Service as a Category One species, which means that it meets the criteria for listing as a threatened or endangered species. Although the butterfly plant is not afforded federal protection as a threatened or endangered species, the U.S. Fish and Wildlife Service has a Memorandum of Agreement with F.E. Warren AFB for protection and management of this species until it is listed. With implementation of appropriate assumed mitigations, disturbance to this plant's habitat during construction will result in a moderate, significant, long-term impact. The woolly milkvetch is listed as rare by the Wyoming Natural Heritage Program and will have a moderate, significant, long-term impact due to habitat disturbance during construction.

The overall impact on threatened and endangered species is moderate in the short and long term due to impacts on the Colorado butterfly plant and the woolly milkvetch. Impacts to the bald eagle will be low during project construction. Since these species are of special federal or state concern, the impacts are significant.

#### Geologic Resources

Geologic resources include geologic hazards, energy and mineral resources (aggregate), and soil resources.

The project will require approximately 4.6 million tons of aggregate for construction. Estimates of available sand and gravel and crushed rock reserves in the region are in excess of 150 million tons. Additionally, exposed lands will be subject to erosion during construction.

The geologic analyses indicate that no significant adverse impacts will result from the project.

#### Noise

Sources of noise, defined as any sound considered undesirable, include vehicular, air and railroad transportation, and construction activity.

Barely perceptible increases in noise would occur due to increased vehicular, air, or railroad transportation. Most noise increases related to construction would attenuate within short distances from the construction activity. The potential for short duration or nuisance impacts resulting from construction activity exists.

The noise analysis indicates that there will be no significant adverse impacts resulting from the project.

#### Air Quality

Air quality addresses the condition of the atmosphere due to emissions from natural and manmade sources and is typically measured with respect to health and visibility implications.

The analysis evaluates the effects of project construction, operation, and related transportation activities upon the future air quality environment. The analysis indicates small increases in carbon monoxide over baseline due to urban vehicular transportation activities. Noticeable increases in fugitive dust would occur due to construction at F.E. Warren AFB, housing construction in Cheyenne, and near roads, cable paths, and Launch Facilities in the Deployment Area. No affect on regional visibility is expected.

The air quality analysis indicates that there are no significant adverse impacts resulting from the project.

## IMPACT OF PROJECT-ELEMENT ALTERNATIVES

Feasible alternatives for road configurations, cable routes, and dispatch stations are identified and the impacts associated with these alternatives analyzed. The analysis demonstrates that for most of the resource areas the level of impact is either negligible or low and not significant, and does not vary within each of the three sets of project-element alternatives. For five resource areas (transportation, biological resources, land use, cultural resources, and energy) there are variations in the level of impact among alternatives and these are summarized here and in Figure S-5.

For transportation, Alternative R1 will have a high level of impact that will be significant due to delays associated with the construction of the Country Club Road bridge improvements.

For biological resources, six buried cable routes were found to have moderate and significant impacts while three additional routes will have a low, significant impact. These impacts generally stem from the likelihood of disturbance of unique or unusual habitat in the project area, particularly riparian, raptor, or aquatic habitat. All three road alternatives at F.E. Warren AFB will have a moderate and significant impact upon a rare plant species found on the base, the Colorado butterfly plant.

The remaining project-element impacts shown are not significant. For land use one of the base road alternatives (R3) may result in a low impact due to potential stimulation of land development resulting from the construction of a new interchange at Interstate 80 and Round Top Road. The individual buried cable paths may have low to high impacts from cultural resources due to their proposed location through areas of varying prehistoric site potential. One of the onbase road alternatives (R2) is rated as high because the right-of-way is adjacent to the Historic District and also passes through several potentially important archaeological sites. Finally, buried Cable Path PA1 will have a negligible energy impact due to its comparatively short length.

## MITIGATION PLANNING EFFORTS

Mitigation planning is an essential element of the Air Force Environmental Impact Analysis Process. The Air Force has committed to certain mitigations and has assumed the application of these within the impact analyses. Additionally, mitigations have been identified which may be implemented, either by the Air Force or others, to further reduce impacts. Under the Memorandum of Agreement between the Secretary of Defense and the Governors of Wyoming and Nebraska, a Mitigation Agreement will be developed after the filing of the FEIS. This agreement will set forth specific measures to be undertaken by the Department of Defense (DoD) within its existing authority to mitigate adverse impacts resulting from the Peacekeeper project. The Mitigation Agreement will also contain a plan for mitigation measures and funding that are beyond DoD authority. Additionally, mitigation planning will occur in response to other regulatory requirements applicable to this project, such as the Endangered Species Act and the National Historic Preservation Act.

## ISSUES RAISED DURING PUBLIC COMMENT PERIOD

Comments on the DEIS were received in the form of verbal testimony during 7 public hearings held at various locations within the Deployment Area and in the form of written comments submitted during the 45-day public comment period. A total of 405 documents, including public hearing testimony, was received. The major concerns resulting from the public comment process are summarized below.





There were criticisms of the EIS process because no hearings were held outside the 5-county Deployment Area and because the 45-day public comment period was considered too short. The Air Force decided to conduct local public hearings only in the areas where construction and deployment activities would occur. Persons outside the Deployment Area who did not attend hearings still had an opportunity to provide written comments which were given equal consideration with verbal comments. The 45-day public comment period is in compliance with Council on Environmental Quality regulations and also permits meeting a Congressionally mandated publishing date of January 31, 1984.

The content of the DEIS was also questioned. In particular, treatment of nuclear war, other basing modes and locations, and psychological effects of deployment were proposed for incorporation into the document. The Air Force considers the possibility of nuclear war to be remote and speculative. Because the purpose of this project is to deter war, nuclear war was not analyzed. Because the decision to deploy this missile in Wyoming and Nebraska had been made under the auspices of the Jackson Amendment referred to on page S-1, coverage of other basing modes and locations was not necessary in this document. Additionally, since the psychological effects could not be directly attributed to the physical changes in the environment caused by the project, this subject was not considered appropriate for inclusion in the FEIS.

Many commenters were concerned about the safety aspects of the deployment and peacetime operation of the system. Other commenters were concerned about Quantity Distance determinations and their impact upon nine homeowners living near Launch Facilities. In response to these concerns, the explanation of safety measures utilized in the operation, transportation, and maintenance of the system was expanded in the FEIS.

The impact of project construction and operation on Deployment Area roads was another issue of great interest. A more detailed explanation of the Defense Access Road Needs process was provided. In addition, more detailed analysis of the transportation impacts was accomplished.

Many persons from the city of Cheyenne were concerned about project impacts on public services. In response, a more thorough analysis of the capabilities of all such services in the community was conducted.

Farmers and ranchers in the area were concerned about the impact of the project on their water supply, their livestock, and on the access to fields or market. Additional analysis of all three areas of concern was conducted for the FEIS.

Agency and interest group comments were received relative to the impacts of the project on biological and cultural resources on F.E. Warren AFB and additional analyses were conducted for the FEIS.

Many other comments were received which contributed to the preparation of the FEIS.

## **1.0 SYSTEM DESCRIPTION, PURPOSE, AND NEED FOR THE ACTION**

### **1.1 Introduction**

In accordance with Presidential direction on April 19, 1983, the Air Force plans to deploy the Peacekeeper missile system within the 90th Strategic Missile Wing at F.E. Warren Air Force Base (AFB) near Cheyenne, Wyoming. In giving this direction, the President was adopting the recommendation of the Scowcroft Commission which he had established in January 1983 to study strategic modernization needs.

The Peacekeeper system is an advanced, landbased intercontinental ballistic missile system designed to improve the nation's strategic deterrent force. The plan calls for the replacement of 100 existing Minuteman III missiles with 100 Peacekeeper missiles. Existing missile Launch Facilities will be used with modifications. Missile replacement will occur within the two squadrons located nearest F.E. Warren AFB, the 319th and the 400th Strategic Missile Squadrons (Figure 1.1-1). In addition, a number of support buildings will be constructed or altered at F.E. Warren AFB which currently serves as the Strategic Missile Support Base (referred to in this document as an Operating Base) for the 90th Strategic Missile Wing. The Peacekeeper missile system is scheduled to achieve initial operational capability in late 1986 and to be fully operational by late 1989. Table 1.1-1 summarizes the Proposed Action and alternatives for this project. The operation and maintenance of the 100 Peacekeeper missiles will generally be carried out in a manner similar to the remaining 100 Minuteman III missiles. This allows for combining many of the communications, security, and other functional operations associated with the two weapon systems. A complete discussion of the Peacekeeper system appears in Section 1.6.

This environmental impact statement (EIS) for the Peacekeeper system has been prepared to meet the requirements of the National Environmental Policy Act of 1969 and the Council on Environmental Quality's regulations. The purpose of this EIS is to assess the impacts of the deployment and peacetime operation of the Peacekeeper system, to analyze project alternatives, including the No Action Alternative, and to develop mitigation measures. The Final EIS (FEIS) contains two volumes. Section 1.0 through 4.0 are contained in Volume 1. Section 1.0 describes the purpose and need for the Proposed Action and alternatives. Section 2.0 describes the affected environment, while environmental consequences along with a comparison of project impacts are discussed in Section 3.0. Section 4.0 describes the scoping activities which were undertaken to identify issues associated with the Proposed Action and the public review and comment process carried out following the issuance of the Draft EIS (DEIS) in October 1983. Volume 2 contains the public comments to the DEIS. Section 5.0 is an introduction and describes the organization of Volume 2. Section 6.0 contains reproductions of all public comments received on the DEIS. This includes letters and transcribed oral comments received at a series of public hearings held in early November. Section 7.0 contains the responses to the individual issues raised during the public comment period.

The impact analysis sections (3.X.X.4) of those resources not found to receive significant impacts as a result of the project have been shortened considerably over that presented in the DEIS so that attention may be focused upon significant impacts. However, full impact analyses for all environmental resource areas may be found in their respective final environmental planning technical reports (Final EPTRs), companion documents to this FEIS.

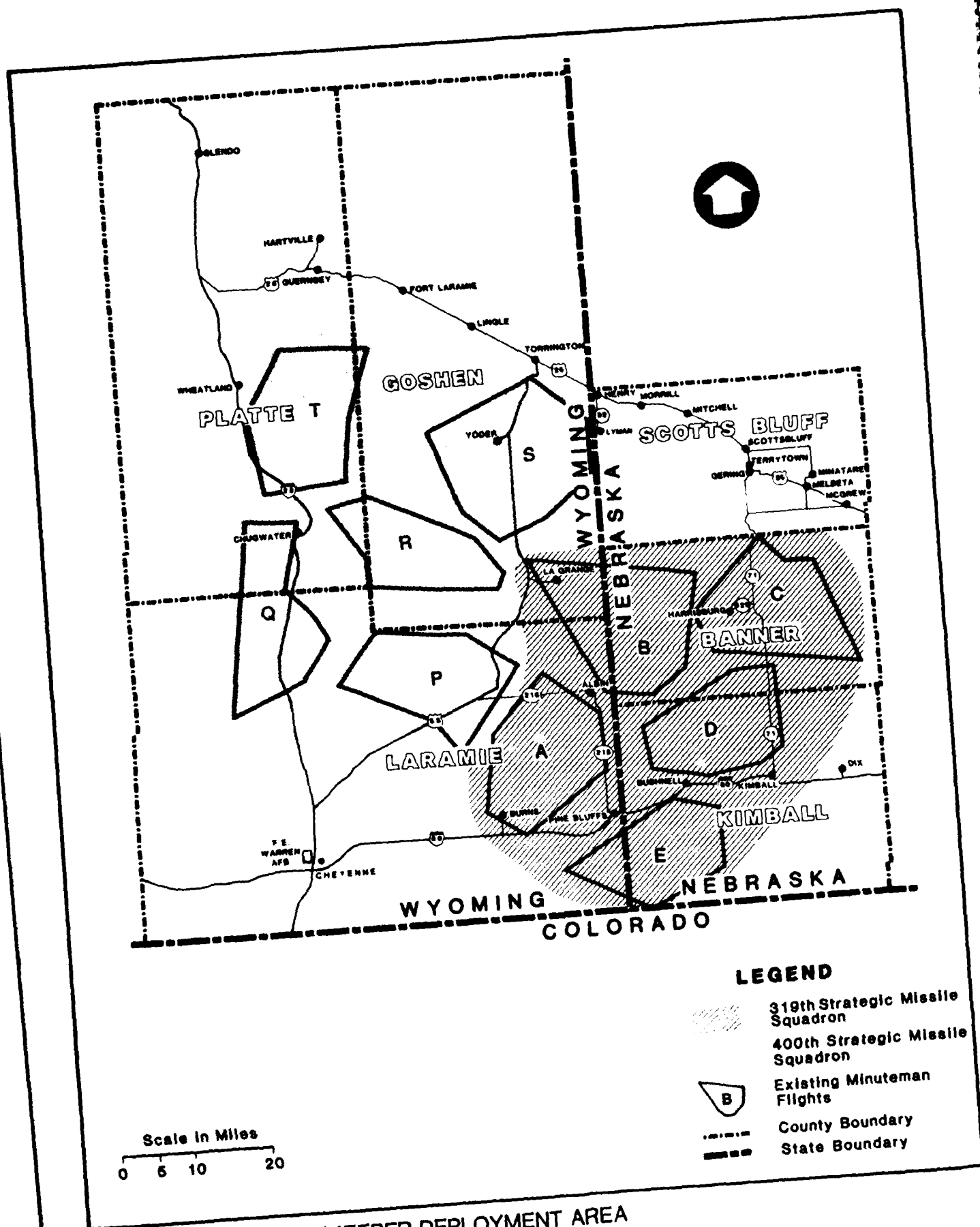


FIGURE 1.1-1 PEACEKEEPER DEPLOYMENT AREA

Table 1.1-1

## SUMMARY OF PROPOSED ACTION AND ALTERNATIVES

Refer to Section:	Proposed Action	Alternatives <sup>1</sup>
1.4	Deploy 100 Peacekeeper missiles in existing Minuteman Launch Facilities in Squadrons 319 and 400; 10 missiles operational in late 1986, full system operational in late 1989.	
1.6.1	Use new stage transporter for Peacekeeper stage transport.	
1.6.2.2	Modify 11 existing buildings at F.E. Warren AFB; construct 14 additional buildings in support of Peacekeeper operations. (For a full list of base facilities see Table 1.6.2-1.)	
1.6.2.3	<u>R2:</u> Construct a new base road between Peacekeeper Storage Area and Gate No. 5; connect Weapons Storage Area with Gate No. 2 using existing base roads or a realignment of Happy Jack Road and removal of the Happy Jack Road overpass; construct a new base road connecting Peacekeeper and Stage Storage Area and Weapons Storage Area or enter/exit the base at Gates No. 2 and 5 as appropriate and use Interstate 25.	<p><u>Alternative R1:</u> New road between Storage Area and Gate No. 5; lower road bed or raise bridge at Country Club Road and Interstate 25; connect Weapons Storage Area and Gate No. 2 by upgrading existing roads and realigning Happy Jack Road; remove Happy Jack Road overpass of Interstate 25.</p> <p><u>Alternative R3:</u> Same as R2 except that Happy Jack Road will not be used. Instead, Round Top Road is upgraded south of the Weapons Storage Area. Access to Interstate 80 is gained via new access ramps at the Round Top Road underpass, or via U.S. 30 east to Interstate 25 south to Interstate 80.</p>

**Table 1.1-1 Continued, page 2 of 2**  
**SUMMARY OF PROPOSED ACTION AND ALTERNATIVES**

<b>Refer to Section:</b>	<b>Proposed Action</b>	<b>Alternatives<sup>1</sup></b>
1.6.3.1	Perform required grading work at the Launch Facilities.	
1.6.3.1	Modify existing Launch Facilities to accommodate the Peacekeeper.	
1.6.3.3	Establish five additional buried cable paths including the acquisition of real estate interests connecting Squadrons 319 and 400: PA1, SB1, RB1, PA4, and PA5.	Other identified buried cable paths are SB2, PB1, PA2, PA3, PD1, and RB2.
1.6.3.4	Upgrade Defense Access Road network to make it compatible with Peacekeeper vehicle requirements. Option A is a mix of gravel upgrades and paving. Under Option B all roads would be paved. Upgrade Launch Facility access roads staying within existing right-of-way; upgrade water drainage culverts and bridges as necessary.	
1.6.6	Construct worker dispatch stations in the northern and eastern portions of the Deployment Area.	Dispatch station only in the eastern portion of the Deployment Area; no dispatch stations.
1.6.8	Operate and maintain Peacekeeper weapon system at 90th Strategic Missile Wing at F.E. Warren AFB	
1.6.3.3, 1.6.10.5.1	Acquire real estate interests and obtain exemptions from the safety requirements as appropriate.	

<sup>1</sup> The No Action Alternative is nondeployment of the Peacekeeper system at F.E. Warren AFB. It serves as the baseline against which project impacts are judged.

## **1.2      Purpose and Need**

Landbased strategic missiles are an integral part of the United States nuclear deterrence strategy. Air, sea, and landbased weapons form a TRIAD of strategic forces, each with different capabilities and advantages to complicate Soviet offensive and defensive planning. The TRIAD also provides a hedge against technical problems that could temporarily disable a system and against technological breakthroughs or a rapid evolution of threats that might erode the survivability of one or more parts of our strategic forces.

The Scowcroft Commission's report outlined a number of conclusions and recommendations relevant to the proposed project. The report stated that the Soviets have a commanding lead in the number of landbased, highly accurate, missile-launched nuclear warheads and show no signs of reducing their current rate of deployment. The Commission concluded that the advantages of the landbased portion of the TRIAD (i.e., low maintenance costs, high reliability, rapid response, and great accuracy) in addition to its contribution to the effectiveness of the TRIAD, make it imperative that the landbased missile system be upgraded to address the challenges posed by the Soviet Union. The Commission recommended the development and deployment of small intercontinental ballistic missiles, each capable of carrying a single warhead, as a long-term solution to upgrading the landbased missile system. However, it also urged deployment of 100 Peacekeeper missiles as an immediate measure to modernize the landbased missile system.

## **1.3      Issues Associated with the EIS Process and Scope of the EIS**

In accordance with the Council on Environmental Quality regulations, a draft of this EIS was circulated for review and comment by the public and appropriate federal, state, and local agencies. Comments were received and are addressed in Volume 2 of this document. There were, however, several EIS policy and procedure issues that are summarized below because of their relevancy to the EIS process and to the scope of this EIS.

### **1.3.1      Other Basing Modes and Locations**

**Issue Raised:** The EIS should analyze alternate missiles, basing modes, and basing locations.

**Discussion:** The proposal to deploy the Peacekeeper missile at F.E. Warren AFB was made by the President in his report to Congress pursuant to provisions of the Jackson Amendment to the 1983 Department of Defense (DoD) Appropriations Act (Public Law 97-377). The President's report discussed alternate missiles, basing modes, and basing locations. The report and the proposals it contained, however, were exempted from the requirements of the National Environmental Policy Act by the Jackson Amendment. In the 1984 DoD Appropriations Act (Public Law 98-94), Congress authorized the Air Force to procure Peacekeeper missiles and directed that they be deployed in existing Minuteman missile silos in the 319th and 400th Strategic Missile Squadrons at F.E. Warren AFB. The Air Force was also directed to prepare an EIS on the deployment and peacetime operations of Peacekeeper missiles in Minuteman silos at F.E. Warren AFB. In light of the President's decisions and Congressional direction, the purpose of this EIS is not to review prior decisions but to analyze the impacts of the implementing action and their alternatives, including the No Action Alternative, and to develop mitigation measures.

### **1.3.2      Other Air Force Programs**

**Issue Raised:** The EIS should include an analysis of programs such as small missile, ballistic missile defense, and superhardening of protective structures.

**Discussion:** The Air Force does have an ongoing research program that is evaluating the feasibility of a range of programs such as protecting intercontinental ballistic missiles with ballistic missile defense systems, superhardening protective structures, basing a missile force deep underground or developing small, single warhead intercontinental ballistic missiles. However, none of these concepts has been analyzed in this document because they are neither part of the Proposed Action nor reasonable alternatives to it. The Peacekeeper deployment has been selected by the President and the Congress has directed the first ten missiles be made operational by December 31, 1986. The Proposed Action does not include deployment of any of the research programs such as superhardening or ballistic missile defense systems.

### **1.3.3      Wartime Impacts**

**Issue Raised:** The EIS should report the impacts associated with nuclear war. The analysis might be a "worst-case" scenario or compare the impact of an attack on Peacekeeper at F.E. Warren AFB with an attack on an alternative missile or basing mode such as Submarine Launched Ballistic Missile.

**Discussion:** Another general issue to emerge from the scoping meetings and public comment period was the concern that deployment of the Peacekeeper missile might induce a nuclear strike from an enemy in time of international tension. Some felt that the environmental impacts of a nuclear attack, particularly in the Deployment Area, ought to be included in this EIS. Others wanted the discussion expanded to analyze the nationwide and global impacts of nuclear war. The Congress, however, in Section 110 of the 1984 Defense Authorization Act, directed the Air Force to analyze the environmental effects of "deployment and peacetime operation." The Peacekeeper system is being deployed to deter war. The possibility of nuclear war is remote and speculative, and the impact dependent on the military actions of a foreign power. However, the impacts of nuclear war would be enormously destructive. The Air Force considers nuclear war to be the ultimate in environmental devastation. If nuclear war occurred, it is unrealistic to think that any part of the United States would be safe from the ravages of nuclear explosions and their after-effects. Peacekeeper is part of the complex TRIAD of strategic systems, all of which must be successfully attacked by an aggressor. The Air Force believes that maintenance of this TRIAD is the most effective way to deter nuclear war.

### **1.3.4      Other Issues**

**Issue Raised:** The EIS should examine the moral, psychological, and arms control implication of deploying Peacekeeper.

**Discussion:** A number of comments requested an analysis of issues that are outside the scope of this EIS. These included requests to analyze the effects of Peacekeeper deployment on arms control and the "nuclear balance." Other comments invited analysis of the morality of building nuclear weapons and of psychological reactions some local residents may have to the Peacekeeper deployment (offended morality, fear of accidents or war, etc.). It is natural for each commentator to assume that an EIS "should be required" to discuss topics of personal concern. The purpose of an EIS, however, is to analyze changes due to the Proposed Action and its reasonable alternatives, including the No Action Alternative, that significantly affect the quality of the human environment. It is not the purpose of this EIS to discuss morality, military tactics, or general societal issues.

### **1.3.5      Public Review Process**

**Issue Raised:** The EIS did not satisfy all the provisions of the National Environmental Policy Act in that scoping meetings and public hearings were not held outside the Deployment Area and the 45-day public comment period was not deemed sufficient for adequate study of the document.

**Discussion:** The Air Force has complied with the provisions of the National Environmental Policy Act. An extensive effort to involve the public was made and specific details on scoping meetings and the public comment process are reported in Chapter 4.0. Preliminary analyses of the Region of Influence of each resource, supported by subsequent detailed studies, indicated that major impacts could be expected only in the immediate vicinity of construction work. Accordingly, the Air Force held scoping meetings and public hearings only in those areas where the residents could be most directly affected by the project. Comments provided by persons who could not attend the public hearings were accepted and given the same attention as those received verbally at the hearings. The 45-day public comment period also conforms with the Council on Environmental Quality requirements. Extension of this period would have made it extremely difficult for the Air Force to comply with a Congressionally mandated FEIS publishing date of January 31, 1984.

### **1.4      Summary of Proposed Action**

The Proposed Action consists of the deployment of 100 Peacekeeper missiles into 100 of the existing Minuteman III missile Launch Facilities currently operated by F.E. Warren AFB. The missile replacements will occur in Strategic Missile Squadrons 319 and 400 (Figure 1.1-1), located in southeastern Wyoming and western Nebraska. The depostured Minuteman III missiles will be transported to Hill AFB in Ogden, Utah for storage in a manner similar to existing Minuteman operations. F.E. Warren AFB will be the Operating Base for the Peacekeeper system and will retain that function for the Minuteman system. A number of new buildings will be constructed at the base, and several existing buildings will require additions and/or modifications. Approximately 6 miles of new road and a number of utility extensions will be constructed on the base. The major operational change in the Deployment Area will be the need for a larger missile stage transporter vehicle which makes a greater number of roundtrips between the Operating Base and the Launch Facilities. Some additional grading work will be required at each Launch Facility. However, no further hardening, deepening, or similar structural modifications will occur at the Launch Facilities. The underground work at these facilities will be limited to the physical and electronic modifications needed to adapt each Launch Facility for deployment of a Peacekeeper missile. Two temporary dispatch stations may be established in the Deployment Area to support the Launch Facility modification effort.

The Launch Facilities are monitored and controlled by Launch Control Centers located within Launch Control Facilities. No surface modifications to the Launch Control Facilities will be necessary. Subsurface changes will involve communications equipment and software modifications necessary for communication with the Peacekeeper missiles.

To allow access of the Peacekeeper missile stage transporter to each of the 100 modified Launch Facilities and 10 Launch Control Facilities, approximately 650 miles of roads will be upgraded (i.e., widened, graveled, and/or paved). Upgrading may also require the replacement or modification of some culverts and bridges. This will be accomplished under the Air Force's Defense Access Road program.

Connectivity between the two Peacekeeper missile squadrons will be provided by the addition of five buried communication cables.



## **1.5 Summary of Alternatives**

Alternatives exist for several of the Peacekeeper system elements. First, at F.E. Warren AFB three new road configurations are under study for linking the new Stage Storage Area and Weapons Storage Area and for achieving access offbase to the Deployment Area. Factors involved in the formation of these alternatives include potential onbase traffic and land use conflicts, efficient access offbase, existing bridge clearance problems along nearby Interstate 25 and the proposed realignment by the Wyoming State Highway Department of an existing county road (Happy Jack Road). These alternatives are more fully discussed in Section 1.6.2.3.

Second, a total of 11 alternative communication cable paths have been identified for linking Squadrons 319 and 400. Of the 11 alternatives, 5 will be selected. These alternatives are discussed in more detail in Section 1.6.3.3.

Finally, dispatch stations (formerly called staging areas in the DEIS) may be established in the Deployment Area during the period of Launch Facility modification. A dispatch station would be a temporary field storage and administration center. Under the Proposed Action two dispatch stations would be established, one each in the northern and eastern portions of the Deployment Area. Although actual locations have not been selected, Chugwater, Wyoming, and Kimball, Nebraska, are representative locations and are analyzed in this EIS. Two dispatch station alternatives are as follows:

- o A dispatch station only in the eastern portion of the Deployment Area; and
- o No dispatch stations.

Dispatch stations are discussed in Section 1.6.6.

## **1.6 System Description**

### **1.6.1 Peacekeeper Missile and its Transport Vehicle**

The Peacekeeper is a four-stage intercontinental ballistic missile capable of delivering up to ten independently targeted and highly accurate nuclear warheads. The missile is approximately 71 feet long, 92 inches in diameter, and weighs 195,000 pounds. It is shown in Figure 1.6.1-1. In contrast, the Minuteman III missile is 60 feet long with a first stage diameter of 66 inches and weighs 78,000 pounds. Three stages of Peacekeeper use solid fuel propellant. A fourth stage is liquid fueled and contains propellants which ignite spontaneously when mixed. Connected to the fourth stage is the Missile Guidance Control Set which controls all the missile system functions.

The four Peacekeeper stages will be shipped from their manufacturing locations to the Air Force Logistics Center at Hill AFB in Ogden, Utah. The stages may be transported individually by road or rail from Ogden to F.E. Warren AFB.

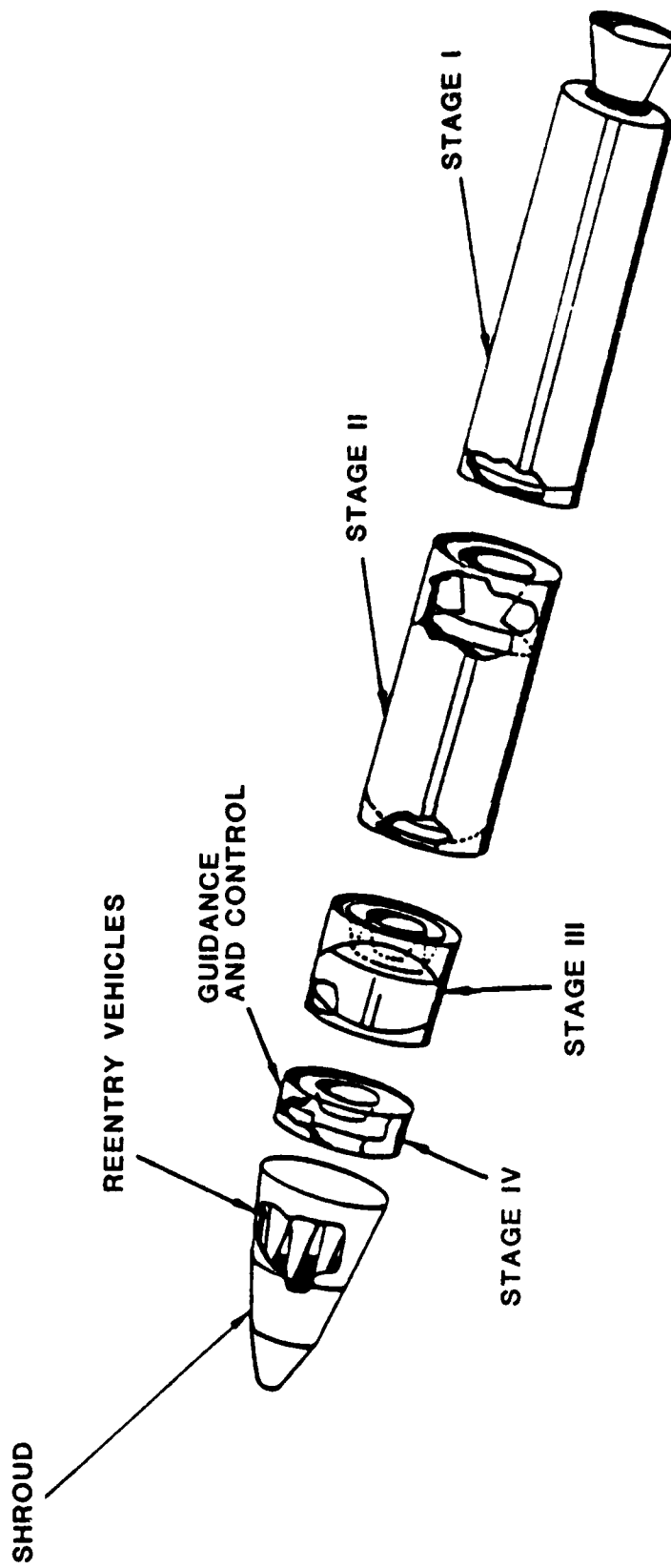


FIGURE 1.6.1-1 PEACEKEEPER MISSILE

Unlike the current Minuteman III, the Peacekeeper will be enclosed within a protective steel canister (Figure 1.6.1-2). The canister is installed when the Launch Facility is modified. The canister serves the functions of debris protection, shock attenuation and missile ejection. A large, commercially available vehicle will be used to transport the canister to its Launch Facility during its modification.

The Peacekeeper will require two vehicles for transport to and placement within a Launch Facility. The stage transporter will be used to transport the individual stages to the Launch Facility. When carrying the first stage, the stage transporter will be about 100,000 pounds heavier, 12 feet longer, and 14 inches higher than the transporter/erector currently used to transport the Minuteman missile. Vehicle dimensions for the stage transporter are 76 feet long, 14 feet 8 inches high, and 10 feet 3 inches wide. Maximum loaded weight will be about 225,000 pounds (Figure 1.6.1-3). At full load, the axle weight will be approximately 13,000 pounds heavier than the transporter/erector. However, since the stage transporter will have twice as many wheels per axle (8), single wheel load will be approximately 600 pounds lighter.

The stage transporter will make four roundtrips between F.E. Warren AFB and a Launch Facility in order to deliver the four stages of the Peacekeeper missile. A fifth roundtrip will occur to transport the reentry system. By comparison, the Minuteman transporter/erector currently makes one roundtrip and delivers the assembled stages. A payload transporter makes two additional roundtrips to deliver the propulsion system rocket engine and Minuteman reentry system.

Once a Peacekeeper stage reaches the Launch Facility it will be transferred to a second vehicle, called a stage emplacer (Figure 1.6.1-4), for insertion into the Launch Facility. The emplacer consists of a tractor and the emplacer itself. The six-axle vehicle will always travel empty to and from a Launch Facility. Its empty weight is 88,000 pounds. Maximum single axle load is about 16,000 pounds. The emplacer is 68 feet long, less than 14 feet wide and 14 feet, 8 inches tall.

## **1.6.2 Operating Base and Vicinity**

The Operating Base for the Peacekeeper system is located at F.E. Warren AFB, immediately west of Cheyenne, Wyoming. The Operating Base provides centralized facilities for missile component storage, assembly, and maintenance. It serves as the command, training, and operational and maintenance center for the weapon system. Figure 1.6.2-1 shows a map of F.E. Warren AFB. Currently F.E. Warren AFB hosts the 90th Strategic Missile Wing which operates 200 Minuteman III Launch Facilities and 20 Launch Control Facilities in the adjacent Deployment Area. In addition to the 3,700 personnel currently stationed at F.E. Warren AFB, approximately 475 additional personnel will be assigned to support long-term Peacekeeper operations.

### **1.6.2.1 Current Base Configuration**

The Minuteman III missile storage area is currently located in the north central portion of the base. The administration, base support, and missile maintenance activities occur along and just south of Randall Avenue in the south central portion of the base. Immediately to the south, and near the east side of the base, is the Launch Facility Trainer. The southern portion of the base includes the logistics and material storage center, the vehicle maintenance area, and the helicopter landing area. Finally, a secure zone near the southwest corner of the base serves as the Weapons Storage Area.

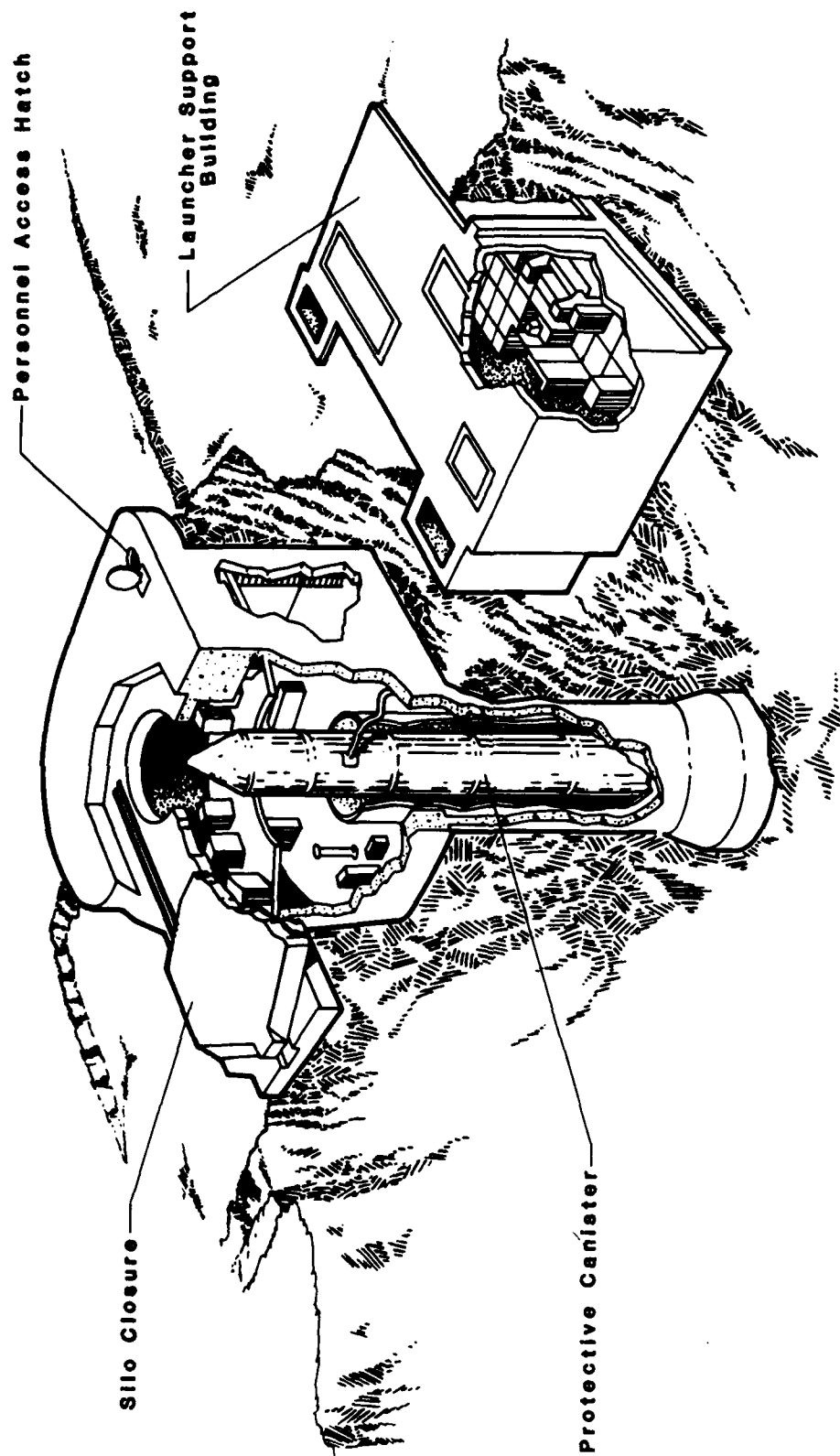


FIGURE 1.6.1-2 PEACEKEEPER LAUNCH FACILITY

OVERALL LENGTH	76'-0"
OVERALL HEIGHT	14'-8"
OVERALL WIDTH	10'-3"
MAXIMUM WEIGHT	225,000 LBS

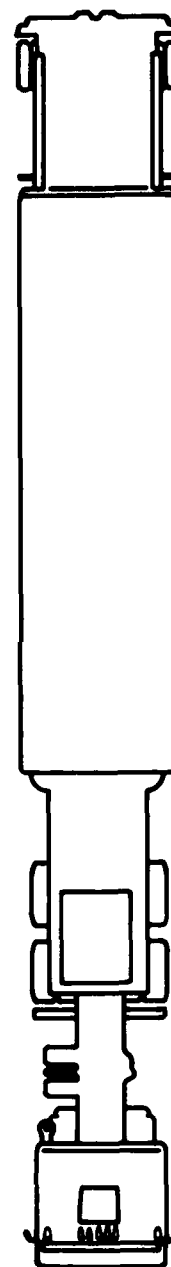
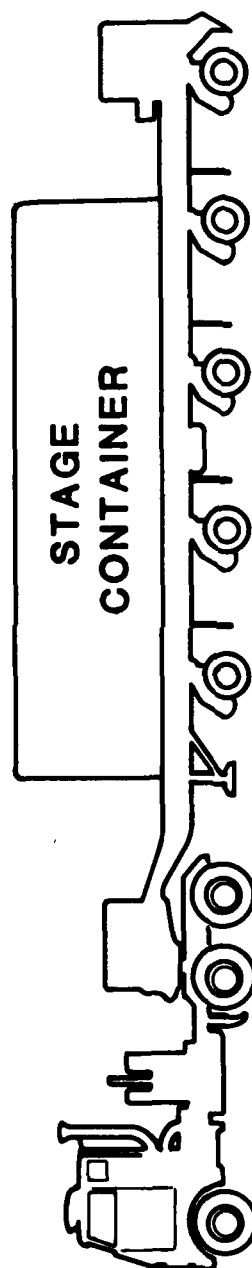


FIGURE 1.6.1-3 THE PEACEKEEPER STAGE TRANSPORTER

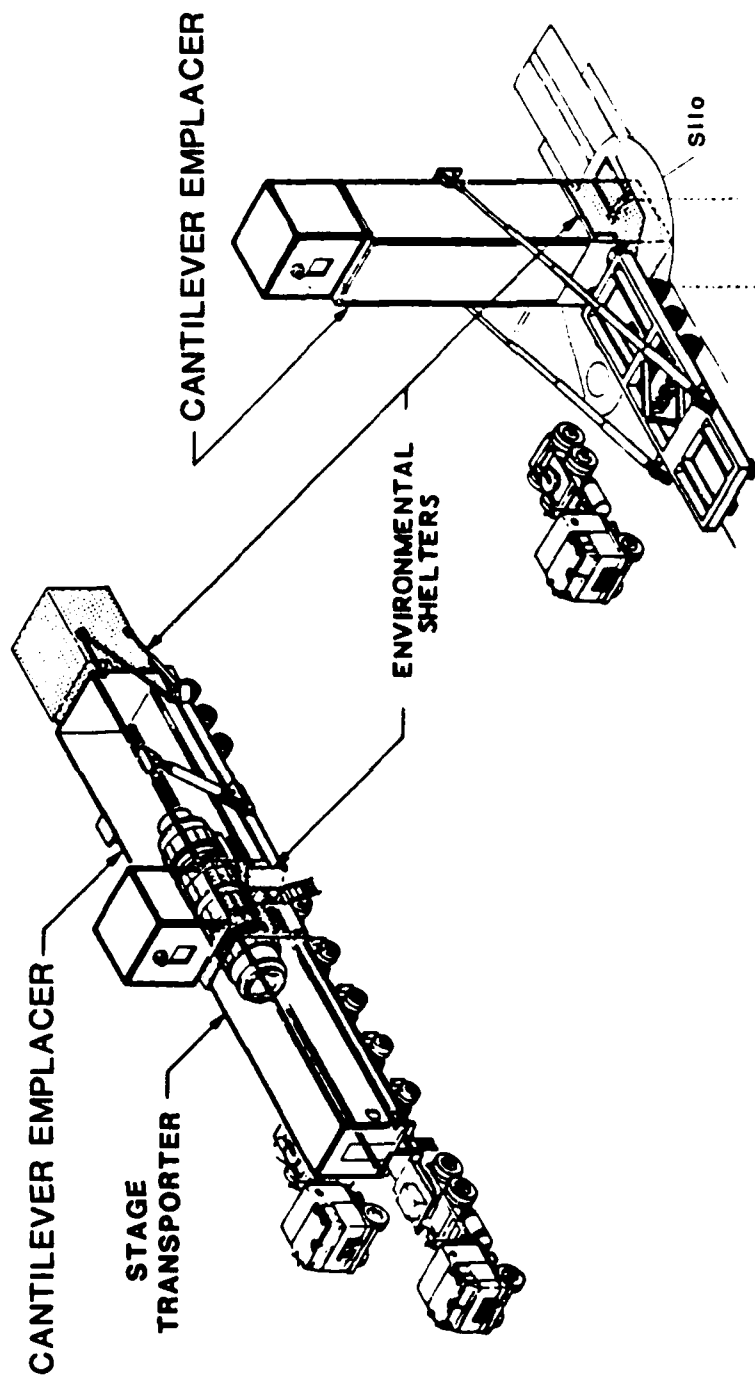
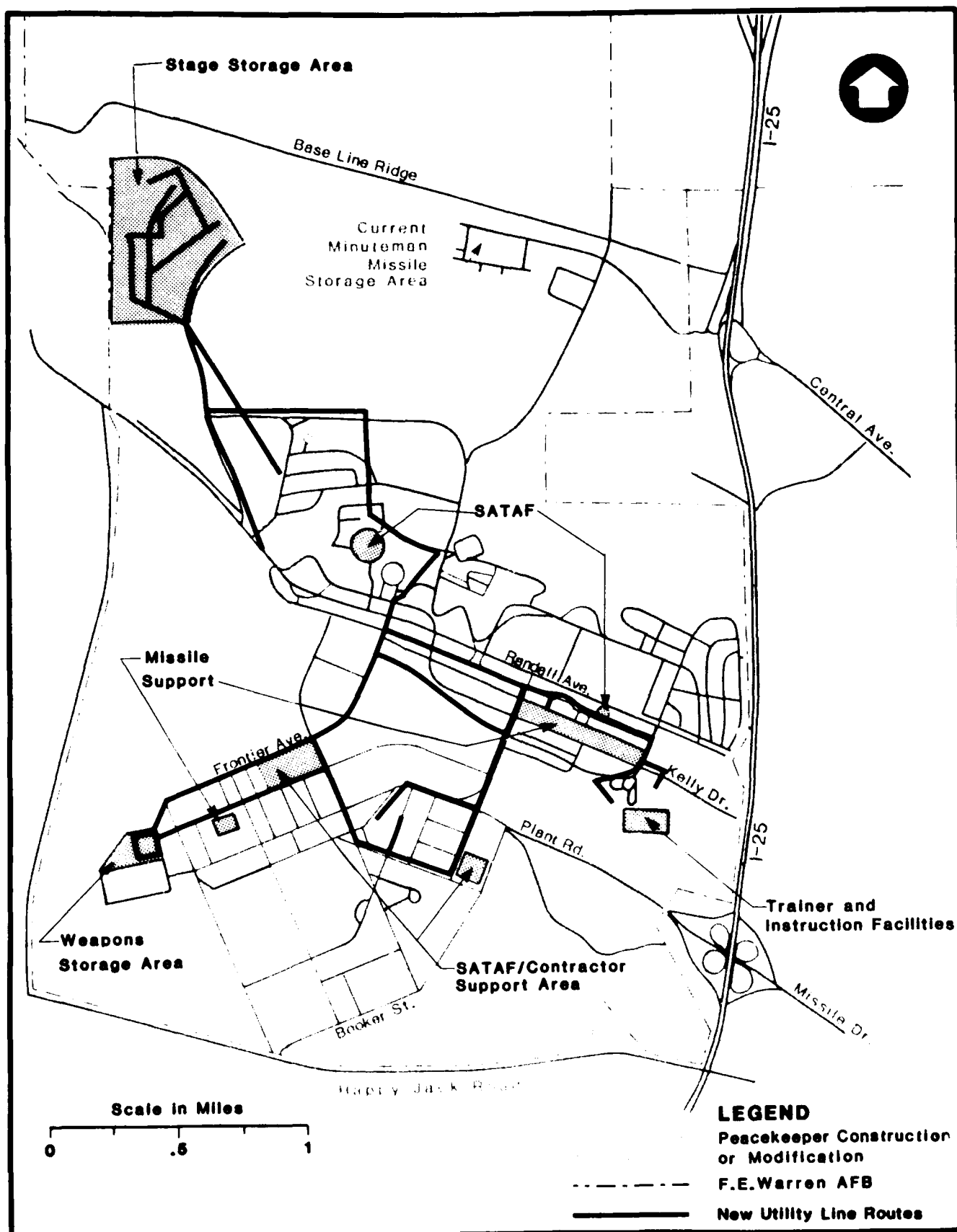


FIGURE 1.6.1-4 THE PEACEKEEPER STAGE EMPLACER



**FIGURE 1.6.2-1 LOCATION OF PEACEKEEPER CONSTRUCTION AND MODIFICATION ACTIVITIES AT F.E. WARREN AFB**

### 1.6.2.2 Peacekeeper Buildings and Utilities

Under the Proposed Action, approximately 360,000 square feet (sq ft) of new floor space will be constructed at the base in support of Peacekeeper operations. Additionally at the base, about 40,000 sq ft of existing floor space will require additions and/or modifications. In addition, various roads, utilities, and other support construction will be required.

A wide variety of locations and conversion options were considered for the base. The current siting of Peacekeeper facilities is based on functional relationships, land use compatibility, and environmental factors. Siting considerations include:

- o Relationships between Peacekeeper and Minuteman functions;
- o Security;
- o Availability of existing facilities;
- o On and offbase land uses and circulation;
- o Explosive safety criteria; and
- o Environmentally sensitive areas of the base.

Table 1.6.2-1 lists the Peacekeeper facilities, their functions, and the other construction to be accomplished at the base. General locations of the buildings at F.E. Warren AFB are shown in Figure 1.6.2-1. All facilities will be built within the existing boundaries of the base. Most Peacekeeper-related construction at F.E. Warren AFB will fall into one of four functional groups.

- o The Weapons Storage Area is colocated with the existing Weapons Storage Area for functional and security reasons, and will thus be located on the southwest side of the base. Among other items, the reentry system and its components will be stored here. Peacekeeper facilities will be constructed in an extension to the north end of the existing Weapons Storage Area. The north end is the only adjoining area that can accommodate the expansion.
- o Peacekeeper missile maintenance and training functions are closely tied to Minuteman functions, both physically and organizationally. Most requirements involve additions or modifications to existing facilities, and the few new facilities will be situated in the industrial area which is located in the south central portion of the base.
- o The Site Activation Task Force and construction support buildings requirements are temporary, so the primary consideration in the location of their facilities is potential for long-term use for base operations following construction. The Site Activation Task Force administrative space will be provided mainly within existing, upgraded facilities in the central part of the base. Industrial facilities, including warehousing and shops, will be located in the industrial area.
- o The Stage Storage Area must be sited in accordance with explosives safety distance criteria and will accordingly be located in an undeveloped area of the base, northwest of existing activity with access to the existing rail spur. The site selected also avoids conflict with other missions (rifle range) and land uses (housing and recreation).



Table 1.6.2-1

PEACEKEEPER MILITARY CONSTRUCTION PROGRAM AT F.E. WARREN AFB<sup>1</sup>

Facility	Location	Quantity	
ADAL Energy Management Control System	INDRL AREA	N/A	
ADAL Missile Maint. Shops (Bldg. 336)	INDRL AREA	5,200	sq ft
ADAL Missile Support FAC (Bldg. 332)	INDRL AREA	10,000	sq ft
Alter Comm Maint. FAC (Bldg. 1250)	INDRL AREA	4,000	sq ft
Alter Missile Maintenance Support (Bldg. 340)	INDRL AREA	2,300	sq ft
Alter Security Control Center (Bldg. 34)	INDRL AREA	2,000	sq ft
Integrated Support Complex	INDRL AREA	164,000	sq ft
Launch Facility Trainer (Silo)	INDRL AREA	N/A	
Misc. Facility Alterations (Bldgs. 152, 250)	INDRL AREA	31,000	sq ft
Roads	INDRL AREA	6	mi
Shops	INDRL AREA	24,000	sq ft
Trainer & Instruction Facility	INDRL AREA	28,500	sq ft
Utilities	INDRL AREA	N/A	
Canister Processing Facility	SSA	10,500	sq ft
Equipment Maintenance Shop FAC	SSA	40,600	sq ft
MSL Stage Processing Facility	SSA	13,000	sq ft
Open Storage (SSA)	SSA	4,000	sq yd
Proof Load Test Facility	SSA	N/A	
Rail Transfer Facility	SSA	N/A	
Special Vehicle Parking Area	SSA	8,500	sq yd
Stage I/II Storage Facility	SSA	4,000	sq ft
Stage III Storage Facility	SSA	1,500	sq ft
Stage IV Storage Facility	SSA	1,000	sq ft
Stage Storage Area Fence	SSA	9,000	LF
ADAL Munitions Supply Inert Storage (Bldg. 1155)	WSA	7,000	sq ft
Alter Standby Power FAC (Bldg. 1168)	WSA	N/A	
Entry Control (WSA)	WSA	750	sq ft
RS AS&I Facility	WSA	42,000	sq ft
RS Storage Facility	WSA	2,000	sq ft
RV Storage Facility	WSA	3,500	sq ft
Segregated Storage Magazine	WSA	4,000	sq ft
WSA Security, Lighting, Fence	WSA	N/A	

<sup>1</sup> From the Peacekeeper Facilities list dated December 7, 1983.

ADAL = Add or Alter  
AS&I = Assembly, Surveillance,  
and Inspection  
Bldg. = Building  
FAC = Facility  
INDRL = Industrial  
MISC = Miscellaneous

MSL = Missile  
N/A = Not Applicable  
RS = Reentry System  
RV = Reentry Vehicle  
SSA = Stage Storage Area  
WSA = Weapons Storage Area

Site plans for each of the facility groups, showing sites for individual structures, continue to be refined and may undergo minor revisions through facility design. However, for purposes of this impact statement, the building locations can be expected to remain in the general locations shown in Figure 1.6.2-1.

New utility lines will be installed to serve the new and renovated facilities. Water, sewer, natural gas, communication, and security lines will be buried. The hot water line used to provide heat to the buildings may either be elevated or buried in a shallow trench. New electrical lines will be either strung from poles or buried. The following is a listing of approximate new linear footage for each utility:

o	Hot Water Line	20,000 feet
o	Communications and Security	34,400 feet
o	Sewer	6,250 feet
o	Water	6,650 feet
o	Natural Gas	8,000 feet
o	Electricity	13,800 feet

The general routes these lines will follow are shown in Figure 1.6.2-1.

#### 1.6.2.3 New and Upgraded Base Roads

The Peacekeeper stage transporter will travel from the Stage Storage Area and the Weapons Storage Area to Launch Facilities in the Deployment Area. Approximately 6 miles of road will be constructed or improved onbase to provide access from these areas to offbase roads, and to improve circulation among Peacekeeper facilities. A new road will be constructed from the Stage Storage Area to Gate No. 5 of F.E. Warren AFB, which exits at the Central Avenue interchange of Interstate 25. A combination of new and existing roads will be used to provide offbase access from the Weapons Storage Area.

Currently, Minuteman transporter/erector travel from F.E. Warren AFB to the northern portion of the Deployment Area is via Interstate 25 north. The eastern portion of the Deployment Area is reached via Interstate 25 south to Interstate 80. The Peacekeeper stage transporter is taller, however, and may encounter bridge clearance problems due to two low overpasses along Interstate 80 at Country Club and Happy Jack roads. In addition, the stage transporter will be traveling between the Stage Storage Area and the Weapons Storage Area. Several new and upgraded roads will be constructed on or immediately adjacent to F.E. Warren AFB. These are discussed in the remainder of this section.

In response to concern over the potential impact to the habitat of a rare plant, the Colorado butterfly plant, the Proposed Action and alternatives for road construction at and immediately adjacent to F.E. Warren AFB have been altered from that shown in the DEIS. Recently completed field work made it evident that the road proposed in the DEIS for linking the Weapons Storage Area with the Stage Storage Area (which paralleled Round Top Road, just inside the base boundary) would seriously impact existing populations of the rare plant and its habitat in the floodplains of the two streams which would be crossed, Crow and Diamond creeks. A study of design options was accomplished by project biologists, transportation specialists, base personnel, and project planners. A new alignment for linking the Weapons and Stage Storage Areas was selected which minimized biological disturbance while achieving onbase transportation requirements.

Figure 1.6.2-2 shows the Proposed Action, R2. The link between the two storage areas curves sharply away from Round Top Road after crossing Crow Creek. It joins existing base roads at the intersection of Frontier and Commissary roads. It then heads west and south to the Weapons Storage Area. Access from the Weapons Storage Area to Interstate 80 and the eastern portion of the missile Deployment Area will remain basically the same as shown in the DEIS. An existing base road will be used to travel south to Happy Jack Road. Happy Jack Road will be realigned to tie into the Missile Drive interchange. The existing Happy Jack Road bridge will be removed in order to rectify a clearance problem. The realignment of Happy Jack Road has already been proposed, independently of the project, by the State of Wyoming. The environmental effects of this action are analyzed in this document since it will be part of the road network used for Peacekeeper operations. Since the Happy Jack realignment will cross through the southeast portion of F.E. Warren AFB, an easement will be granted to the State by the Air Force. Access from the Stage Storage Area to Gate No. 5 will be by a somewhat different route than that shown in the DEIS, although the length of this link will remain about the same. The new alignment results in better access to the rest of the base from Gate No. 5. From Gate No. 5, the stage transporter can access Interstate 25 via the Central Avenue interchange for travel to the northern portion of the Deployment Area.

A design option exists for R2 for connecting the two storage areas. Round Top Road could be upgraded to allow offbase travel for a distance of 1.4 miles. Locked gates would be maintained at the western extensions of Randall and Frontier roads. Alternatively, the possibility exists that the stage transporter may be able to travel under the existing Happy Jack Road and Country Club Road overpasses. Should this prove to be the case and should the realignment of Happy Jack Road and subsequent removal or reconstruction of the existing bridge not be accomplished before initial Peacekeeper deployment in 1986, then a second design option exists. The stage transporter would use existing base roads for access between the Weapons Storage Area and Gate No. 2.

Alternative R1 is basically the same as discussed in the DEIS and is shown in Figure 1.6.2-3. Offbase access from the Weapons Storage Area would be the same as described above: realignment of Happy Jack Road and removal of the existing Happy Jack Road bridge over Interstate 25. Offbase access from the Stage Storage Area would also be the same as for the Proposed Action. However, under this alternative, the two storage areas would be tied together by use of Interstate 25 between Central Avenue and Missile Drive. Along this stretch of Interstate 25, one low bridge, Country Club Road, may impede the passage of the stage transporter. With R1, the Country Club Road bridge would be raised. A design option of lowering the Interstate 25 roadway to achieve adequate clearance is also available. As with the Happy Jack Road overpass, certain driving precautions (use of the right lane) may allow passage of the stage transporter underneath the current Country Club Road bridge, removing the need for road or bridge construction at this location. In addition, if Happy Jack Road is not realigned, existing base roads may be used for access between the Weapons Storage Area and Gate No. 2 as described above.

Under Alternative R3 (Figure 1.6.2-4), the Stage Storage Area would be linked to Gate No. 5 and the northern portion of the Deployment Area in the identical manner as discussed previously under R2. The Weapons and Stage Storage Areas would be linked in a manner identical to that described for the Proposed Action: a new onbase road or a design option using an upgraded section of Round Top Road. However, offbase access to the eastern portion of the Deployment Area would be via Round Top Road. Two options exist to accomplish this. New on and offramps could be constructed at the current crossing of Round Top Road underneath Interstate 80. Alternatively, Round Top Road could be traveled to its southern terminus at U.S. 30; then U.S. 30 east to Interstate 25 south; and finally Interstate 80 east. This latter option would not require any bridge or onramp construction. The current Happy Jack and Country Club Road bridges over Interstate 25 would not be impacted under Alternative R3.

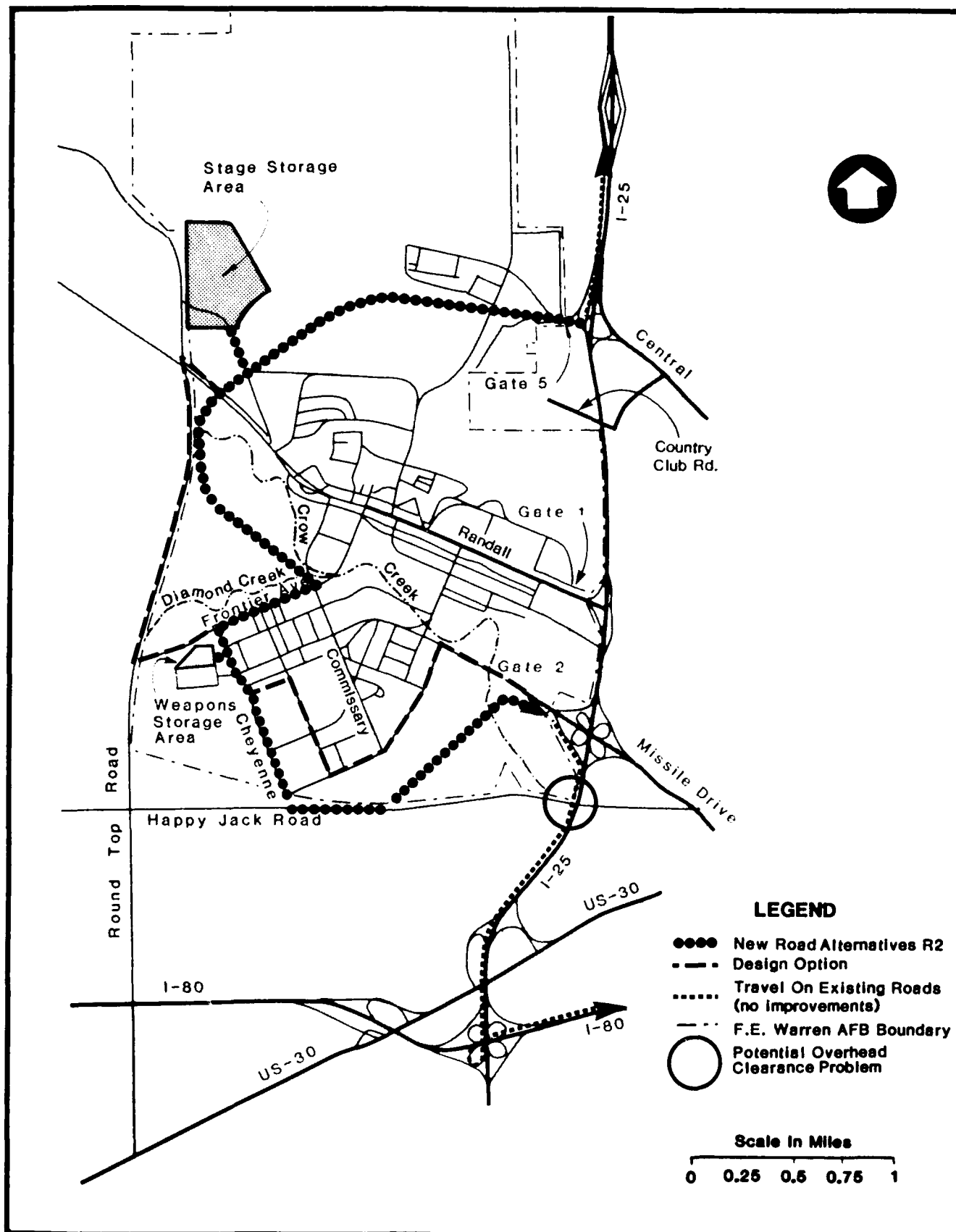


FIGURE 1.6.2-2 NEW ROADS AT F.E. WARREN AFB: PROPOSED ACTION-R2

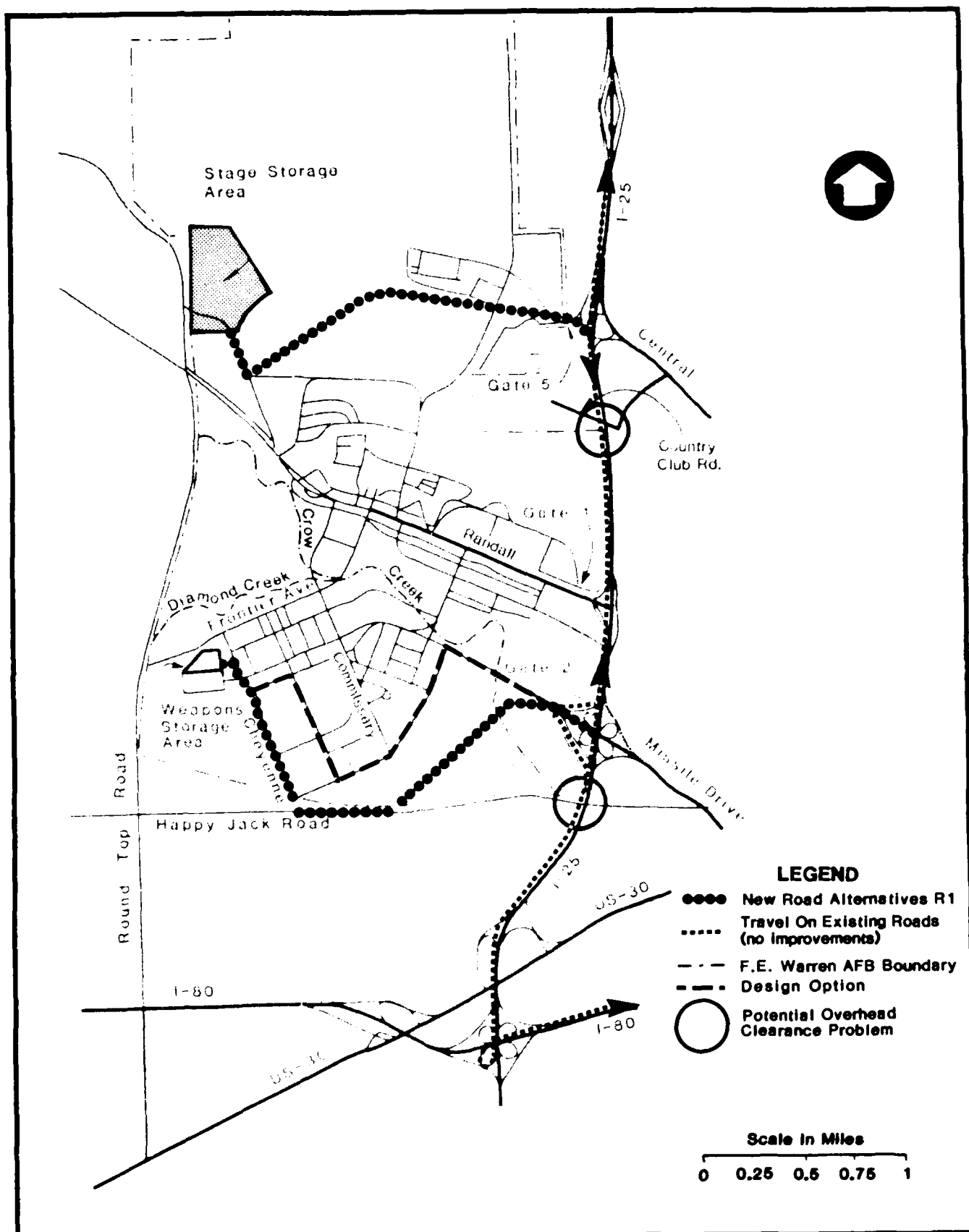


FIGURE 1.6.2-3 NEW ROADS AT F.E. WARREN AFB: ALTERNATIVE R1

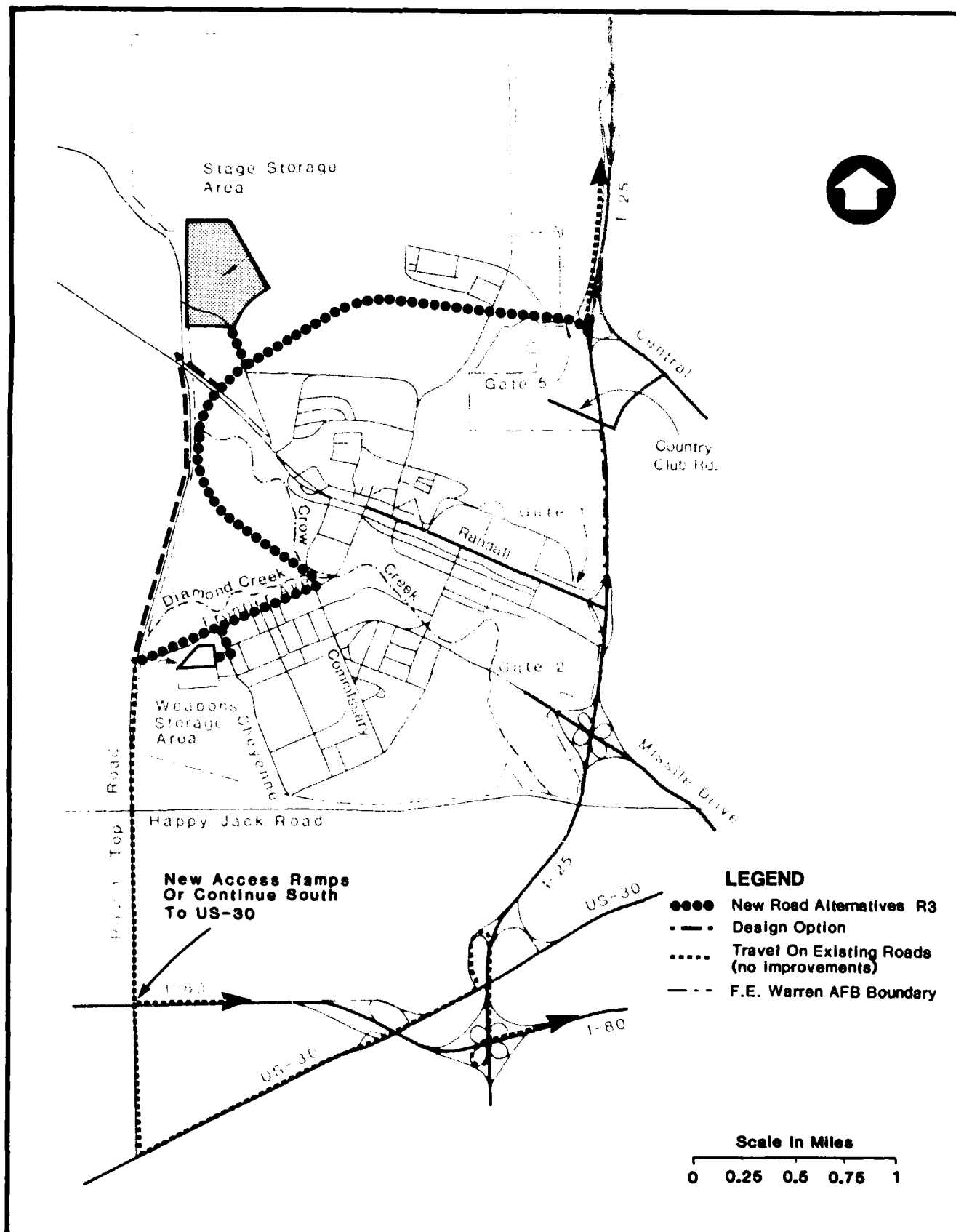


FIGURE 1.6.2-4 NEW ROADS AT F.E. WARREN AFB: ALTERNATIVE R3

### **1.6.3      Deployment Area**

Major components of the Deployment Area are:

- o    One hundred Launch Facilities;
- o    Ten Launch Control Facilities;
- o    A buried cable system; and
- o    A system of existing state, county, and DoD roads that provide transportation access to the Launch Control Facilities and the Launch Facilities.

#### **1.6.3.1      Launch Facility**

The Launch Facility is the remote, unmanned missile site. Launch Facilities are generally situated in sparsely populated land areas inside fenced areas of approximately 1.2 acres each. Within this area are the silo (see silo description below), three security antennas, UHF antenna, Launcher Support Building, and service area. The silo includes the launch tube, the launcher closure, dual-level equipment room, and provisions for personnel access. The site is also provided with access roads and vehicle maneuvering areas.

The Launcher Support Building is an underground structure with its roof at ground level. The Launcher Support Building is located adjacent to the silo. Support equipment within the building includes a diesel generator to supply electrical power to the silo in the event of commercial power failure, and a brine chiller for the silo's environmental system. A gravel service area surrounding the silo and Launcher Support Building is primarily for maintenance and support for vehicle maneuvering and parking. Support pads/tie-downs will be used for supporting the emitter and stage transporter used during emplacement and removal of missile components.

The primary power to the Launch Facilities is supplied by commercial powerlines. Following Peacekeeper modification, each Launch Facility is estimated to have a peak electrical requirement of 32 kilowatts (kW) and an average annual consumption of 219 megawatt hours (MWh). This power will be used to run the communications, monitoring, and other electrical support equipment in the silo, the Launcher Support Building, the security monitors, the missile guidance equipment, and the ventilation, dehumidifier, and brine chiller equipment. In case of failure of the commercial power, standby power is provided by a 75-kW diesel generator. If both these systems are lost, emergency power is available from batteries.

The security system used to protect the Peacekeeper system during transport, maintenance, and operational readiness will be identical to the Minuteman III system. The security system will comply with DoD Directive 5210.41M of the Nuclear Weapons Security Manual (a classified document).

Since two large vehicles will be needed at one time to deliver and insert Peacekeeper stages individually at a Launch Facility, more maneuvering room is needed. Grading will be performed at the Launch Facility to achieve this additional maneuvering room.

Below-ground Launch Facility modification (prior to Peacekeeper deployment) will be scheduled to follow the required site grading and access road upgrades. Launch Facility modification will occur in a systematic order so that portions of no more than three Flights will be depostured at any one time. Peacekeeper deployment will first occur in Flights P, Q, and T.

The remaining order of Peacekeeper deployment by Flight is: R, S, B, C, D, E, and A (Figure 1.1-1). As project planning progresses the order of Flight deployment may change slightly.

Major modification steps at each Launch Facility are:

- o Expansion of vehicle maneuvering area and installation of new emplacer support/tie-downs.
- o Deposturing of missile site  
Remove reentry system, missile guidance set, and communications security system. Remove Minuteman III missile and transport back to base. These missiles will be stored at Hill AFB in Ogden, Utah.
- o Hardware removal and Launch Facility disassembly  
Establish contractor's temporary work area at the Launch Facility site. Remove operational ground equipment racks and other hardware.
- o Launch Facility modification  
Remove Minuteman equipment from the launch tube. Remove upper portion of the launch tube. Install operational support equipment and electronics in the equipment room and Launcher Support Building. Install the canister/shock isolation system in the launch tube.
- o Assembly of Peacekeeper and return of Launch Facility to operational status  
Transport and install Peacekeeper missile stages. Test the various missile support subsystems. Insert the communications and security equipment, and the reentry system.

The modification activity and Peacekeeper insertion will take about 3.5 months at each Launch Facility. During this period, crew sizes will vary but will not exceed about 30 workers. The maximum number of vehicles at any one Launch Facility will not exceed 20. Parking will occur either at the Launch Facility or its access road.

#### 1.6.3.2 Launch Control Facility

Ten unmanned Launch Facilities make up a Flight of missiles. Each Flight receives primary support and control from a manned Launch Control Facility. Each Launch Control Facility contains a buried Launch Control Center and an above-ground support building. The Launch Control Center is hardened against attack, and the support building provides a kitchen, an electrical generator room, a security control center, and living quarters for support personnel. Each Launch Control Facility is fenced within a 5-acre site and includes parking for a number of trucks and vehicles, including limited room for the stage transporter.

Normally 50 Launch Facilities and 5 Launch Control Centers are electronically connected by the buried cable system to form a Minuteman squadron. Intersquadron connections for Peacekeeper will be obtained by adding five new cable links between the 319th and 400th Strategic Missile Squadrons. Even though each Peacekeeper Launch Control Center will be primarily responsible for 10 missiles, each Launch Control Center will be capable of monitoring and commanding any of the 100 Peacekeeper missiles. No surface modifications will occur at the Launch Control Facility. The only modifications within the Launch Control Facility will involve the electronic equipment and computer software.



### **1.6.3.3 Buried Cable Systems**

Squadron-wide communications between Launch Control Facilities and Launch Facilities is accomplished via the buried cable system. This is a network of buried and hardened communication cables connecting all Launch Facilities and Launch Control Facilities in a redundant manner. The easements for these buried cables are marked by short poles whose distances generally vary between about 500 to 1,500 feet.

Five additional buried cables will be installed between the 319th and the 400th Squadrons. Further field and technical analysis conducted since the issuance of the DEIS has resulted in some changes to the list of potential cable routes. PD1 has been removed from the Proposed Action and added to the list of alternatives. A new route, PA5, has taken its place. SC2 was dropped from the list of alternatives because of its substantially longer length. Finally a new route, RB2, has been added as an alternative. There are now 11 possible cable routes shown in Figure 1.6.3-1. Each route is defined by a mile-wide path through which a specific cable route would be chosen should that alternative be selected. Some portions of the path follow existing rights-of-way while others go overland. These routes were sited using available data and may be modified to reflect additional engineering and environmental studies as indicated in Section 3.X.X.4 of applicable resources. For example, the 100-foot minimum distance between new cable and powerlines and other systems requirements may be waived for segments to minimize interference with ongoing agriculture uses. Similarly, routes which are shown to cross private property may also be modified to follow the boundary, fenceline, or furrow of a field or to connect to an existing splice case. Through more detailed site surveying and planning, the routes may need to be further adjusted to maintain a minimum of 7,900 feet between the new cable, existing cable, and Launch Facilities. Fundamental criteria in establishing the cable routes are to maximize the survivability of the system and to minimize the buried cable length. In selecting the final set of five routes, a constraint is imposed that no two cables may share a common segment for any portion of their lengths. Thus the following routes are mutually exclusive: PA2, PA4; RB1, RB2; and PA3, PA5, PD1, and PB1. The Proposed Action includes routes RB1, PA5, PA4, PA1, and SB1. They have a combined distance of 82 miles. The longest distance of any acceptable combination of 5 cables is 110 miles.

The easements for PA1 and SB1 were acquired some time ago. Easements for the other paths will be acquired for cable installation and maintenance. Landowners will be allowed to carry out normal ranching or agricultural operations over the permanent right-of-way following cable installation. A temporary easement width of 35 feet will be needed for trenching and cable placement. The permanent easement width will be 16.5 feet.

### **1.6.3.4 Deployment Area Roads**

A system of designated roads in the Deployment Area is used to transport missile components to Launch Facilities and for security patrol. These include existing Minuteman transporter/erector routes.

Transporter/erector routes include interstate highways, state-owned primary and secondary roads, and county roads. Most roads in the state system are paved, 2-lane highways at least 24 feet in width, and are well maintained. Approximately 410 miles of primary and secondary roads, including approximately 140 miles of interstate highways, are designated transporter/erector routes in the Deployment Area. There are approximately 400 miles of county roads in the transporter/erector network.

Some county-owned gravel roads accommodate cars and vans only. These roads are used by security police patrolling the Deployment Area.

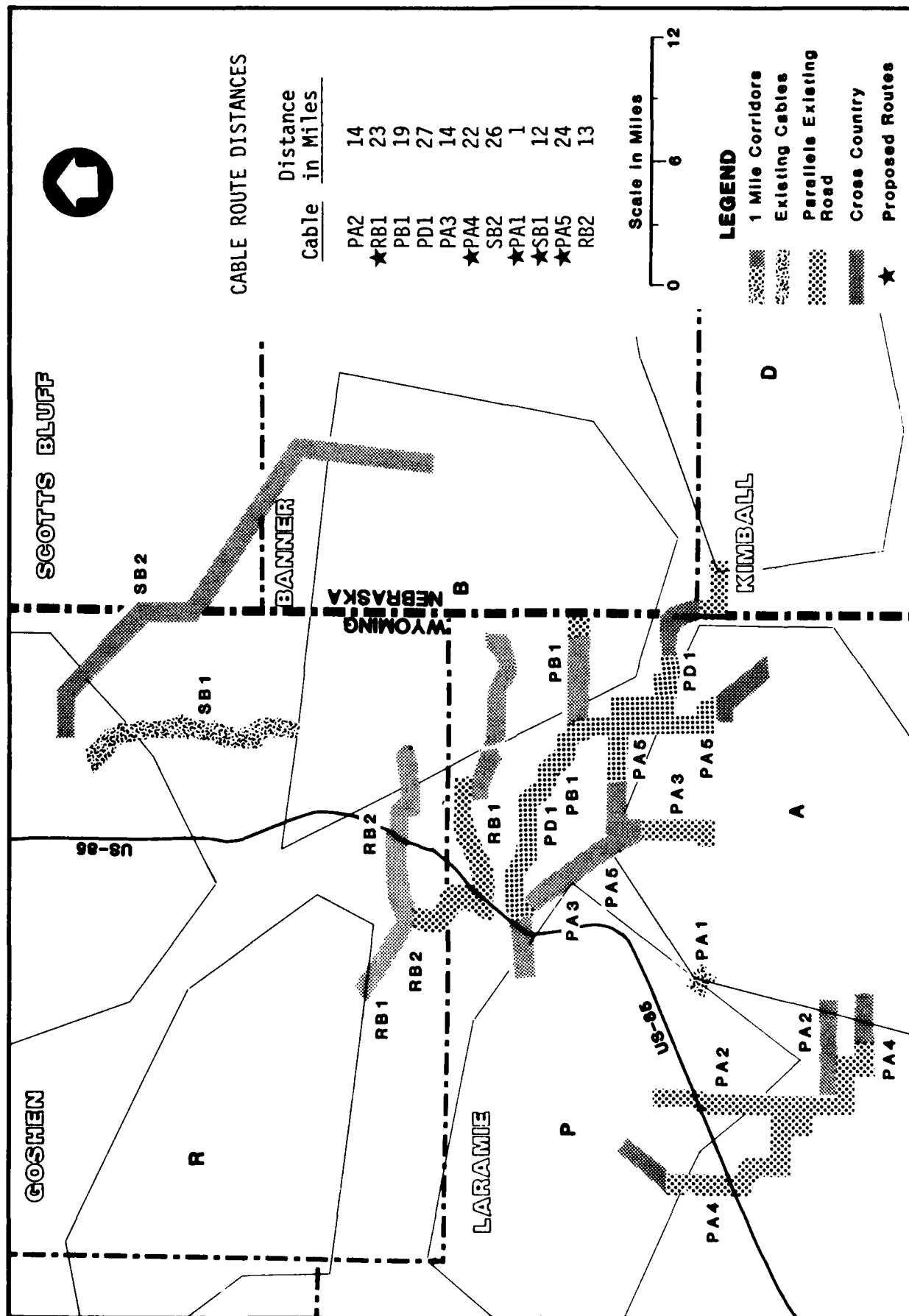


FIGURE 1.6.3-1 ALTERNATIVE BURIED CABLE ROUTES

Existing transporter/erector roads will be used by the stage transporter for the transport of the Peacekeeper missile components to the Launch Facilities to the maximum extent possible. In addition to the two low bridges described in Section 1.6.2, three additional low clearance bridges have been identified. One is the existing railroad overpass on State Highway 71 near Kimball, Nebraska. The stage transporter can avoid this bridge by detouring 2 miles west on an existing county road, crossing the railroad at grade, and returning to State Highway 71. The second is the Interstate 25 underpass by Bear Creek Road (28 miles north of Cheyenne) leading to Launch Control Facility Q1. This can be remedied by lowering Bear Creek Road. The third bridge clearance problem is the Interstate 25 underpass (2 miles north of Hill Road, and 34 miles north of Cheyenne) leading to Launch Facility Q3. This can be corrected by lowering the county road. Several other potential access restrictions to individual Launch Facilities have been identified and will need to be rectified by the project.

A number of the county, state, and DoD roads will have to be upgraded to carry the heavier and wider Peacekeeper operational vehicles. In addition, some culverts and bridges may have to be strengthened or replaced. The DoD will pay for any upgrade or modification of Defense Access Roads that is required to meet its operational needs. In addition, the DoD will pay for any road repairs resulting from damage caused by construction vehicles during the construction of the aforementioned road upgrades. The process for determining upgrade requirements and consequent funding needs was initiated by the development of the Defense Access Roads Needs Report. This report detailed both routing and load requirements and identified potential problem areas. This report was submitted through the Federal Highway Administration to the state highway agencies which produced a detailed analysis of existing road capabilities, necessary upgrade requirements, and associated costs. These recommendations for improvements were reviewed by the Federal Highway Administration and are awaiting approval or adjustment by the Military Traffic Management Command. This approved plan will be the basis for subsequent appropriation requests from Congress. When the appropriation is passed, the state highway agency will be charged with carrying out the work.

In response to meetings with officials of the Federal Highway Administration, Nebraska Department of Roads, the Wyoming Highway Department, and local road departments, two preliminary surfacing options have been identified for upgrading the Defense Access Roads. Both options involve the repaving of 305 miles of existing roads. In addition, surfacing Option A involves the paving of a portion of the gravel roads supporting Peacekeeper operations. Surfacing Option B would result in paving all gravel roads used for Peacekeeper movement and represents the maximum level of construction associated with road upgrades in the Deployment Area. A total of 642 miles of road in the Deployment Areas of Wyoming and Nebraska would be resurfaced at Air Force expense under these options as shown in Figure 1.6.3-2 and Table 1.6.3-1. This does not include the upgrade of interstate highways. The additional 250 miles of road surfacing now being analyzed over that specified in the DEIS is a result of more detailed project definition. The Defense Access Road system remains basically the same. All road upgrades will meet the standards of the respective states. Further details may be found in the transportation section (3.1.9.4).



Table 1.6.3-1

## SURFACING OPTIONS FOR THE DEFENSE ACCESS ROADS

	Option A	Option B (All-Asphalt)
Wyoming	Gravel/Gravel <sup>1</sup> , 181 miles	Gravel/Paved <sup>3</sup> , 181 miles
	Asphalt Overlay <sup>2</sup> , 305 miles	Asphalt Overlay <sup>2</sup> , 305 miles
Nebraska	Gravel/Gravel <sup>1</sup> , 71 miles	Gravel/Paved <sup>3</sup> , 71 miles
	Gravel/Paved <sup>3</sup> , 85 miles	Gravel/Paved <sup>3</sup> , 85 miles

<sup>1</sup> Gravel upgrade of existing gravel roads

<sup>2</sup> Asphalt overlay of existing paved roads

<sup>3</sup> Asphalt paving of existing gravel roads

#### 1.6.4 Mitigation Features Incorporated into the Project

Environmental impacts of the Proposed Action and its project element alternatives may be mitigated by commonly practiced construction methods or by standard Air Force procedures. To the extent practical in consideration of operational requirements, schedule and budget, standard construction practices that help reduce or eliminate environmental impacts are taken into account as part of the project. These assumed construction practices and other assumed mitigation measures are discussed at the beginning of each resource's Section 3.0 analysis (Section 3.X.X.4). The Air Force has committed to implementing these assumed mitigations. Additional, potential mitigation measures to further reduce impacts from the Proposed Action can be found in Section 3.X.X.6 of each resource. Implementation of these potential mitigation measures may be constrained by budget limitations and mission requirements.

#### 1.6.5 Project Schedule

The overall schedule calls for the Peacekeeper system to be fully operational by the end of 1989. Major milestones to meet this schedule are as follows:

- o Initiate construction at F.E. Warren AFB spring 1984
- o Complete construction at F.E. Warren AFB summer 1986
- o Upgrade Defense Access and DoD roads spring 1985  
to fall 1987
- o Modify 100 Launch Facilities early 1986  
to late 1989

- o First 10 Peacekeeper missiles become operational late 1986
- o All 100 Peacekeeper missiles become operational late 1989

#### **1.6.6 Manpower Requirements and Dispatch Station Alternatives**

Direct manpower estimates for construction, assembly and checkout, and operation of the Peacekeeper system are shown in Table 1.6.6-1. This table shows the average annual workforce for each year of construction.

Under the Proposed Action, two dispatch stations would be established. One would be established in the northern portion of the Deployment Area in 1987 at a location which has yet to be specified. In this EIS, Chugwater, Wyoming is analyzed as a representative community for location. In 1988 a second dispatch station would be established in the eastern portion of the Deployment Area. Its location is also undetermined at this time and Kimball, Nebraska is analyzed in this EIS as a representative location. Dispatch stations are temporary facilities established by and for the convenience of the contractors involved in Launch Facility modification. They serve primarily to minimize personnel travel. They will vary in size from 1 to 5 acres. The dispatch stations would also be used for the temporary open storage of equipment and material, as check-in points for personnel proceeding to nearby work sites, and for vehicle dispatch and parking for up to 100 passenger vehicles. One or more buildings would also be present at each site for contractor use as temporary office space for up to 25 personnel. All dispatch stations will be removed prior to project completion. In addition to the Proposed Action, two dispatch station alternatives are considered in this EIS:

- 1) A single dispatch station in the eastern portion of the Deployment Area; or
- 2) No dispatch stations.

#### **1.6.7 Construction Material and Other Resources**

The quantity of materials needed for construction at F.E. Warren AFB and the Deployment Area is shown by industrial category in Table 1.6.7-1. The industry-specific material estimates in Table 1.6.7-1 represent initial project design and industrial requirements. The individual cost estimates were derived from applied percentage factors (derived from experience with other Air Force missile construction efforts). As final design and construction of the project proceeds, the actual purchases will vary from this preliminary estimate. Total materials cost is estimated to be 145 million dollars. Contractors are expected to procure all construction materials.

A number of construction and support materials will be obtained from sources within the project area. Among the materials exerting major influence on assessment of project impacts were aggregate (4.6 million tons), water (516 acre-feet), fuel (7.6 million gallons), and electricity (3.8 million kWh). In the case of water supply for construction, the Air Force will identify and, if necessary, obtain permits for the water or purchase existing water rights.

#### **1.6.8 Operations**

Operations for Peacekeeper will begin as the Launch Facilities are repostured, and continue throughout the life of the system. Once the system is fully deployed, activities will consist of weapon system operations, security, maintenance, and occasional equipment replacement. Operations personnel and their dependents will live on F.E. Warren AFB or in the Cheyenne area. Approximately 475 additional personnel will be stationed at the base to support long-

Table 1.6.6-1

## AVERAGE PEACEKEEPER MANPOWER REQUIREMENTS BY YEAR

	1984	1985	1986	1987	1988	1989	1990	1991 and on
<b><u>Deployment Area</u></b>								
Construction	5	40	60	60	40	0	0	0
Defense Access Roads	0	275	315	150	0	0	0	0
Assembly and Checkout and Site Activation Task Force	0	15	210	285	265	265	10	0
Subtotal:	5	330	585	495	305	265	10	0
<b><u>F.E. Warren AFB</u></b>								
Construction	100	630	70	0	0	0	0	0
Assembly and Checkout and Site Activation Task Force	40	130	525	555	515	510	22	0
Operations								
Military	0	63	303	374	384	384	359	359
Civilian	0	67	112	116	116	116	116	116
Subtotal:	140	890	1,010	1,045	1,015	1,010	497	475
TOTAL:	145	1,220	1,595	1,540	1,320	1,275	507	475

Source: Estimates based on average quarterly employment.

Table 1.6.7-1

**ESTIMATED PEACEKEEPER MATERIAL REQUIREMENTS  
BY STANDARD INDUSTRIAL CLASSIFICATION**

<b>Industrial Classification</b>	<b>Estimated 1982 Dollars<sup>1</sup> (1,000s)</b>
Fabricated Structural Metal	22,999
Unclassified Professional Services and Products	14,358
Cement and Concrete Products	10,862
General Wholesale Trade	8,890
Structural Metal Products <sup>2</sup>	11,983
Millwork, Plywood, and Wood Products <sup>2</sup>	3,941
Copper, Copper Products	3,902
Electrical Lighting and Wiring	3,871
Stone and Clay Mining and Quarrying	39,728
Stone and Clay Products <sup>2</sup>	2,955
Basic Steel Products	1,233
Heating and Air Conditioning Apparatus	1,525
Plumbing and Plumbing Fixtures	938
Petroleum Refining and Product	5,148
Material Handling Equipment	1,970
Sawmills and Planing Mills	1,478
Paints and Allied Products	1,478
Plastic Products <sup>2</sup>	1,478
Furniture and Fixtures	986
Structural Clay Products	986
General Hardware	986
Scientific Instruments	986
Rail Transport	986
Real Estate (in support of contractor operations)	986
Construction, Mining, and Oilfield Machinery	749
<b>TOTAL:</b>	<b>145,402</b>

<sup>1</sup> Unrounded figures derived from a materials proportioning analysis.

<sup>2</sup> Not included in other Industrial Classifications.



term Peacekeeper operations. The operational impacts assessed for each resource in Section 3.0 would continue to be realized at the same level of impact for the reasonably foreseeable future.

One major change in Deployment Area operation over current conditions will be the greater number of roundtrips by the stage transporter between F.E. Warren AFB and an individual Launch Facility to accomplish Peacekeeper missile replacement. The current Minuteman III requires two roundtrips of its transporter/erector for replacement of the major portion of the missile. Four additional roundtrips of the payload transporter are required for replacement of the propulsion system rocket engine and reentry system. In contrast, the Peacekeeper stage transporter will make 10 roundtrips to accomplish a similar operation:

	<u>No. of Roundtrips</u>
Removal of the reentry system:	1
Removal of the four stages:	4
Replacement of the four stages:	4
Replacement of the reentry system:	<u>1</u>
	10

In addition, the emplacer will make one roundtrip, remaining onsite during the entire operation.

#### **1.6.9      Operational Life**

The Peacekeeper system is expected to remain operational for 20 to 30 years. Peacekeeper decommissioning would entail a variety of physical, socioeconomic, and environmental consequences. Several years will be required to establish realistic alternatives, plan for their implementation, conduct the required environmental reviews, and carry out the selected action. Congress, the DoD, the Air Force, state and local agencies, and the public will participate in the process. All actions will be in strict compliance with the laws applicable at the time.

#### **1.6.10     Public Safety and Health**

The DoD and the Air Force have formal safety programs covering missile operations. These programs are guided by directives and regulations establishing policy and procedures; specifications, manuals, and pamphlets providing detailed safety requirements for reviews and inspections, training, and a mandatory reporting system for identification of safety-related problems.

##### **1.6.10.1    System Safety Engineering**

Military Standard 1574A, System Safety Program for Space and Missile Systems, was tailored to the Peacekeeper weapon system for the specific purpose of designing safety into the system from the beginning of the program. All of the guidance and experience gained from previous missile programs was combined with the latest system safety hazard analysis methods to produce Space and Missile Systems Organization (SAMSO)-STD-79-1, the "Integrated System Safety Program for the M-X (Peacekeeper) Weapon System." This evolution has yielded a program that identifies and defines means of coping in advance with accident risks encountered from initial design through deployment.

The basic objective of this program is to identify potential accident risks and define methods to eliminate or minimize these potential risks. This is the most extensive and comprehensive system safety engineering program ever applied to a DoD weapon system. It is an integrated,

formally documented safety program which began during the conceptual phase and includes the active participation of numerous associate contractor safety staffs. The program encompasses the design, development, fabrication, checkout, modification, test, servicing, maintenance, transportation, handling, training, deployment, and normal/contingency operations of all elements. Elements of the Peacekeeper weapon system include operational and test flight vehicles; the ground support equipment required to handle, transport, service, maintain, checkout, and test all elements of the Peacekeeper weapon system; the ground and flight software required to checkout and control all elements of the weapon system; and the operation and test facilities.

The safety analysis and evaluation techniques prepared for Peacekeeper were built upon the experience gained from Minuteman. Fault Tree Analyses play a major role in analysis of both missile systems, but further refinement was gained for the Peacekeeper by the development of Hazard Control Analysis and Hazard Control Assessment Reports. The Fault Tree Analyses were (and continue to be) used to identify potential accident risks and establish design criteria which eliminate or control accident risks and provide the basis for hazard assessments. Hazard control assessment reports identify operational constraints and cautions/warnings to minimize or control those risks which cannot be eliminated by design.

These reports are developed concurrently with system design and submitted periodically for detailed review, analysis, and evaluation. This iterative process starts with the system conceptual phase and continues throughout its life cycle from development through retirement. It is updated at the end of each program phase to describe tasks and responsibilities required for the subsequent phase. Computer systems are used to track identified hazards to ensure they are followed until satisfactorily resolved. The existing design review process thus provides the framework to maximize safety and reliability of the system.

#### 1.6.10.2 Nuclear Weapon Safety

Nuclear safety requirements are dictated by DoD Directive 5030.15. The efforts to ensure maximum nuclear safety consistent with operational requirements start with the nuclear system development cycle and continue until the system is retired. Air Force Regulation 122-2 tailors this directive to Air Force needs and establishes the Nuclear Weapon System Safety Group to conduct safety studies and operational reviews of nuclear weapon systems for which the Air Force has operational, custodial, or developmental responsibility. This group also includes non-Air Force members such as the Defense Nuclear Agency and the Department of Energy.

In-depth studies and rigorous reviews ensure that the nuclear weapon system design features and procedural safeguards are sufficient to meet the four DoD nuclear safety standards:

- o Prevent accidents or incidents involving nuclear weapons and jettisoned weapons from producing a nuclear yield;
- o Prevent deliberate prearming, arming, launching, firing, or releasing of nuclear weapons, except upon execution of emergency war orders or when directed by competent authority;
- o Prevent inadvertent prearming, arming, launching, firing, or releasing of nuclear weapons; and

- o Ensure adequate security of nuclear weapons pursuant to the provisions of DoD Directive 5210.41.

In order to meet these standards, Air Force Regulation 122-10 defines the minimum criteria that apply to the design of a nuclear weapon system. The application and conformance to these design criteria are independently reviewed by two agencies, the Air Force Weapons Laboratory and the Air Force Directorate of Nuclear Surety. Detailed reviews by these two groups assure that these criteria are met. Specific requirements are applied to safety devices to ensure that critical nuclear controlling functions are always under positive control. Of particular interest are the design requirements that must be met to preclude the occurrence of certain catastrophic events:

- o Inadvertent release of nuclear yield: The numerical specifications for nuclear weapon safety are that the probability of unintentional significant nuclear yield will be less than 1 in 1 billion per service life of the system.
- o Inadvertent programmed launch: The probability of an inadvertent launch of the fully assembled weapon system must be less than 1 in 10 trillion.
- o Prearming: Faults or failures in the nuclear weapon system that result in inadvertent transmission of the prearm command will not occur with a probability greater than 1 in 1 million.
- o Premature nuclear detonation: After application of the intent command and deliberate launch until the final warhead arming, the numerical specification for the probability of a premature nuclear detonation is 1 in 10,000 per event.
- o Accidental motor ignition: The probability of accidental propulsion system, rocket motor, or engine ignition resulting in warhead movement in normal environments shall not exceed 1 in 10 million per missile per system lifetime.

Development and use of insensitive high explosives in the Peacekeeper reentry system represents another safety improvement over previous weapons systems. Insensitive high explosives are particularly effective in ensuring that ignition occurs only upon direct command. Those to be used with Peacekeeper have been rigorously tested and qualified to verify their insensitive nature in all shock, crush, and thermal environments which could result from potential mishaps. Test results show a consistent picture of an explosive which is safer to handle than any previously studied. The application of insensitive high explosives to the Peacekeeper system provides a margin of safety over previous reentry system designs.

#### 1.6.10.3 Missile Components

The Peacekeeper propulsion system is similar to that of the Minuteman series, 1,000 of which are currently deployed. The Peacekeeper missile uses three solid-propellant rocket motors and a small liquid-propellant rocket engine. The solid propellants are rubber-like substances which propel the missile when ignited by a high-temperature starting device. The chemical composition of two stages is aluminum and ammonium perchlorate. In addition to these two compounds, a third stage propellant also contains cyclotetramethylenetetranitramine. The liquid fuel stage propellants are monomethylhydrazine (MMH) which is the fuel, and nitrogen tetroxide ( $N_2O_4$ ), which is the oxidizer. These are contained in separate, hermetically sealed tanks. Ignition occurs by the hypergolic reaction of these two propellants. Each propellant tank contains approximately 85 gallons of liquid. They are released under controlled (metered) conditions during flight. The reentry system includes ten reentry vehicles each containing nuclear material and insensitive high explosives.

#### 1.6.10.4 Accident Risks

Accident risks are associated with storage at the support base, and transportation and deployment at the Launch Facility. An extensive system safety program has been in existence since the start of the conceptual studies for the Peacekeeper weapon system. This safety program not only applies existing safety criteria gained from past experience on weapons design, but also analyzes the system and all its components to determine the accident risks in all operating modes. The risks or hazards are then eliminated by design or controlled to an acceptable level. Although the possibilities of accidents occurring in storage at the support base, during transportation, and during deployment in the Launch Facility are extremely remote, nevertheless they are discussed below.

##### 1.6.10.4.1 Storage

The stages are placed in facilities located in the Stage Storage Area until needed for transport to the Missile Stage Processing Facility for preparation and subsequent assembly at the Launch Facility. The most probable occurrence of an accident in the Stage Storage Area would be as a result of handling. Handling involves the loading and off-loading from the transport vehicle. However, the missile stages arrive in their special shipping containers which provide protection from climate, static-electrical buildup, and minor damage which could occur due to handling of unprotected stages. The stages, even without any protection, are designed to withstand unrestrained falls (drops) from various heights without deflagration or detonation. The solid-propellant stages are received from the manufacturer fully fueled and the propellants are not handled thereafter. Similarly, the liquid-propellant stage is received from its manufacturer fully fueled and the propellants are not handled thereafter.

The Weapons Storage Area is a secured compound designed for the safe warehousing of the reentry system which contains the reentry vehicles. No source of energy exists within the Weapons Storage Area sufficient to produce a nuclear hazard. The reentry vehicles are designed to withstand extremely high temperatures. Therefore, the probability of an accident damaging the reentry vehicles while in storage is extremely remote. The Stage and Weapons Storage Areas are quite remote from each other. An accident in the Stage Storage Area would not affect the Weapons Storage Area. Additionally, the reentry vehicles are stored in a separate facility within the Weapons Storage Area. This facility has a sufficient safety standoff distance from other adjacent facilities to prevent damage from occurring to the reentry vehicles due to explosions in these other facilities.

##### 1.6.10.4.2 Transportation

As discussed earlier, individual stages are transported from the Stage Storage Area to the Launch Facility. Vehicle mishaps are the most likely cause of accidents that could potentially cause a stage to ignite, burn, or explode. The missile stages are transported separately within special transport containers. The stage transporter is a highly stable, structurally sound, and nuclear certified vehicle. The Minuteman program provides insight into missile transportation safety. Over 1 million miles have been logged by the Minuteman transporter/erectors which transport the assembled missile over public roads. Yet, during transportation, buildup, and storage of Minuteman motors and missiles, there have been no incidents of accidental ignition or detonation. Only 5 transportation accidents involving an assembled Minuteman missile have occurred over the past 19 years. None of them resulted in motor ignition, burning, or detonation. Ogden Air Logistics Center, which is the current weapons system manager for Minuteman, reports that during the system's life to date, over 11,000 Minuteman missile movements have been made by air, rail, or road. In addition, over 12,400 individual Minuteman solid stages and over 1,400 individual Minuteman liquid-fueled propulsion system rocket engines have been transported without mishaps. Because the Peacekeeper and Minuteman

fuels are directly comparable with regard to explosive safety, as well as the increased safety design of the Peacekeeper, the safety of the Peacekeeper system is expected to exceed that of the Minuteman.

#### 1.6.10.4.3 Launch Facilities

While in the Launch Facility, the missile is in a benign and isolated environment, protected from outside sources of ignition, deflagration, or detonation. History shows that the probability of these mishaps within the Launch Facility is extremely remote. Electrical hazards to the propulsive stage ignitors are precluded by the design of the stage ignition system. Shock or fragments from the liquid propellant stage gas pressurization system or other pressurized devices are not sufficient to create a stage detonation. Thermal conditions could possibly occur which could create a hazardous situation if one or both hypergolic fuel and oxidizer tanks in the liquid propellant stage were penetrated, leaked, or burst. However, the probability of this occurring is extremely low. It is possible that an explosion or detonation could occur from a deliberate or irrational act, a human-caused accident, or an Act of God. However, the reinforced concrete launch tube and the separate steel canister surrounding the missile would effectively minimize blast effects, should some abnormal event initiate a deflagration or explosion.

During modification of the Launch Facilities for Peacekeeper, the existing lead-acid batteries will be replaced with sealed lead-acid and lithium batteries which do not normally emit hydrogen gas; reducing potential problems due to hydrogen gas generation. During charging of the lead-acid batteries, there is a chemical reaction to prevent the buildup of hydrogen gas within the battery. If there is a short in the battery or it is exposed to extreme heat, the lead-acid battery could build up hydrogen gas and trip a pressure relief mechanism to prevent a bursting of the battery. This extremely unlikely event could cause the venting of hydrogen gas which would be removed by the facility ventilation system. The ventilation system's 20 cubic feet per minute of outside air exchange capacity will preclude hydrogen concentrations from building to unsafe levels. If the ventilation system fails, an alarm is transmitted to the Launch Control Center for the dispatch of maintenance teams. The teams conduct oxygen and explosive gas tests before entering the facility.

Launch Facilities T-2 and T-3 in the 400th Strategic Missile Squadron lie within the Wheatland-Whalen Fault System and Launch Facility T-9 lies along its projection. Most available data do not support a model of primary strain release by fault displacement along the system. The most recent episode of tectonic movement on the Wheatland-Whalen Fault System, except for a small feature at Brush Creek, would probably be considered older than late Quaternary and thus, the Fault System would not be considered active. However, the Brush Creek feature is described in a published document (McGrew 1962) as a Quaternary fault based on radiocarbon dates of snail shells. For further information on the Wheatland-Whalen Fault System the reader is referred to the Geologic Resources EPTR.

It is reasonable to conclude based on 1) the physics of fault movements, 2) the dissected nature of the fault scarp, and 3) the deposition of unfaulted Quaternary sediments over much of the fault trace, that the Wheatland-Whalen Fault System is not capable of generating large-magnitude earthquakes and surface rupture. However, because the area is adjacent to other areas of minor tectonic activity, such as the Southern Rocky Mountains, small stresses may be transmitted into the T-Flight area to produce occasional minor ruptures along zones of weakness formed in earlier tectonic episodes. Such ruptures would probably generate small-to-moderate-magnitude earthquakes ( $M_L = 5$  to 6) similar to those listed in the historic record. Although there is data to suggest the Wheatland-Whalen Fault System is not active, these data are inconclusive and therefore, for the purpose of safety issues, the Fault System is conservatively being considered active by the Air Force.

Assuming the Wheatland-Whalen Fault System is active and therefore capable of producing ground shaking and surface rupture, the maximum postulated earthquake is estimated to be magnitude 7.5. The silos are designed to withstand ground shaking in excess of that produced by the maximum postulated earthquake. Therefore ground shaking poses no safety threat to the silos. The primary safety concern from the maximum postulated earthquake is surface rupture. Probabilities can be estimated either using a Poisson or a Weibull process for earthquake/faulting occurrence. Assuming a 20-year life expectancy of the system and that the 900 feet of documented Cenozoic movement has occurred since the start of the Pliocene, the Poisson probability distribution is approximately  $1 \times 10^{-3}$  to  $5 \times 10^{-4}$  whereas a Weibull distribution would give a probability ranging from  $1 \times 10^{-4}$  to  $3 \times 10^{-7}$ . These values represent the probability of surface rupture in the vicinity of the Launch Facility and not the probability of a silo, a canister and a missile rupture causing an accident severe enough to pose a threat to public health and safety. The probability of such a severe accident is even less than the probability of surface rupture and is considered extremely remote.

#### 1.6.10.4.4 Accident Scenarios

In the event of an extreme abnormal environment, ignition of the three solid stages can take place by subjecting the propellant to severe shock, impact, or frictional heating by projectiles penetrating the motor case and propellant. The only place the propellant could be penetrated without penetration of the case is in the nozzle area. Should an accident result in propellant ignition and the case remain intact, the stage would burn propulsively. Should ignition take place through case penetration, the result would be a pressure-vessel type explosion.

Two stages use propellants which normally burn rapidly. They would not detonate upon ignition but may explode if their containers are ruptured. In the event of a case rupture, tests of these stages have shown that an explosion could distribute pieces of burning propellants of various sizes as far away as 1,000 feet. Similarly, in a case rupture of the third stage, the propellant can explode when ignited. The third stage propellant, however, does not burn well at atmospheric pressure, therefore, in a burst case accident both burned and unburned propellant could be scattered.

One stage motor uses liquid propellants which ignite when mixed. They are stored in separate, hermetically sealed containers, filled at the factory and never opened in the field. Should an accident result in the rupture of the MMH fuel tank only, both toxic and fire hazards would result. MMH is flammable over a range of 2.5 percent to 98 percent mixture with air and can be ignited by sparks or open flames. Should the oxidizer  $N_2O_4$  tank alone be ruptured, again both toxic and fire hazards would result. Combustibles and other organic materials can ignite spontaneously when mixed with  $N_2O_4$ . Should an accident result in rupture of both tanks and mixing of the propellants takes place, a fire and explosion would result with temperatures of approximately 5,600 degrees Fahrenheit. In the event of a spill, the liquid would spread over a relatively small area (5 to 8-foot diameter circle) on an absorbent surface such as sand or gravel. On a nonporous surface, the area of spread would be larger (20 to 30-foot diameter circle).

If through one of the abnormal events that have been postulated, an explosive component of one of the missiles did accidentally detonate while operational, consequences would be restricted to airblast, fragments and the possible, but very unlikely, breaking up of one or more of the reentry vehicles. This latter occurrence would result in the dispersal of nuclear material particles. However, it is much more likely that the component containing nuclear material would be blown out of the Launch Facility in a relatively intact condition and no nuclear material would be dispersed. The reentry vehicles are designed to withstand extremely high temperatures. Therefore, it is extremely unlikely that nuclear material could ever be

aerosolized by the heat of an explosion and then subsequently carried to surrounding areas. With the absence of any energy source during storage or transportation, the chance of a nuclear accident in locations other than the Launch Facility are even more unlikely.

#### **1.6.10.4.5     Responses to Accident Scenarios**

In the event that one of the identified mishaps should occur, established contingency response activities would take place. These Air Force Contingency plans are discussed later in this section. Basically, the response to all mishaps is the same initially. Response personnel secure the mishap location establishing a 2,000-foot diameter cordon around the location within which personnel are evacuated, medical care provided to the injured, and fire suppression exercised as applicable. The specific evacuation distance and precautionary actions would depend on wind, weather, and physical conditions at the time and location of the incident. Once the initial activities are completed and the affected area cordoned, then more specific actions can be taken based on the individual situation at hand. Missile stages engulfed in fire would be allowed to burn out. The stages contain oxidizer within the propellant making it extremely difficult to extinguish. A damaged motor case which has not ignited would be secured and returned to the support base. A leak involving the liquid fuel or oxidizer would be cleaned up after it was properly diluted/neutralized. Contaminated soil would be removed from the mishap site and disposed of in accordance with applicable federal and state criteria.

Although an accident involving nuclear weapons is unlikely, contingency plans for Nuclear Accident and Incident Control (NAIC) are formulated and exercised frequently to ensure their currency. Nuclear Accident and Incident Control is designed to minimize injury, loss of life, and destruction of property resulting from an accident or incident. The command and control personnel are responsible for conducting recurring training and exercises in NAIC to ensure a high state of readiness for command and control of any nuclear accident or incident until the on-scene commander arrives.

### **1.6.10.5     Safety Procedures**

#### **1.6.10.5.1     Explosive Safety**

The DoD Directive 5154.4-S and Occupational Safety and Health Administrative Standard 1910-109 establish safety criteria for explosives. In turn, the Air Force implements the direction provided in these directives, with respect to Air Force operations, in Air Force Regulation (AFR) 127-100. AFR 127-100, "Explosives Safety Standards," sets forth safety criteria for operations involving explosives and gives added guidance for establishing an explosives mishap prevention program. It also contains guidance on processing waivers, exemptions, and deviations when it has been determined, for strategic or other compelling reasons, to be impractical to comply with stated requirements. These requirements and guidelines permit the Secretary of the Air Force to evaluate and grant an exemption to explosive safety criteria.

In order to protect people (military and civilian) as well as buildings from the potential destructive force of an explosion, Air Force Regulation 127-100 prescribes safety clear zones or Quantity Distance separation criteria to be applied to an explosive storage location. These distances are based on the most severe accident (maximum credible accident) at each location. For the Proposed Action, there are three basic storage locations for explosives: the Stage Storage Area, the Weapons Storage Area (both at F.E. Warren AFB), and the Launch Facilities (in the Deployment Area). The criteria specify safe separation distances between locations where explosives are based, stored, or processed, and other surrounding locations such as inhabited buildings, public traffic routes, powerlines, and pipelines. The largest separation distance or Quantity Distance from an explosive location is that for an inhabited

building. Inhabited Building Distance is the minimum distance from a potential explosive site to all buildings, locations, or structures, other than other explosives locations, used in whole or in part as a habitation or place of assembly for people, both within and outside the military establishment. These distances offer a high degree of protection from blast effect for frame and masonry buildings and for their occupants. They give reasonable protection to superficial parts of structures such as doors, window frames, porches, and chimneys. Quantity Distances do not protect against glass breakage or personal injury from glass fragments.

For planning purposes, Quantity Distance requirements for a Peacekeeper Missile in a Launch Facility are 1,750 feet to inhabited buildings and 1,050 feet to public traffic routes. This compares to the current requirements of 1,200 feet to inhabited buildings and 720 feet to public traffic routes for Minuteman. These distances are based on the assumption that the total net explosive weight of the stored explosives (in this case the Peacekeeper missile) will mass detonate. These distances are intended to protect the public in the event of a maximum explosive accident, i.e., the involvement of all four Peacekeeper missile stages detonating in the Launch Facility.

The foregoing safe distances are established for prudent planning purposes. The distances will be verified following more complete simulation and testing activities prior to early summer 1984. Quantity Distance criteria may be addressed in a variety of ways, including acquisition of real estate interests, relocation of inhabited buildings, obtaining exemptions from the Secretary of the Air Force, or a combination of these. Real estate purchases would include restrictive easements to preclude future encroachment of inhabited buildings. In the case of public roads it is anticipated that exemptions will be granted, as is the case for the current Minuteman missile system. The basis for such an exemption would be the low probability of a vehicle being within an exposure area at the time the explosion occurred.

#### **1.6.10.5.2    Physical Security Measures**

Because of the strategic importance of nuclear weapons and the need to ensure against their unauthorized use, the Weapons Storage Area includes not only security and armed guards, but also elaborate protective devices. Physical security is intended to prevent unauthorized access not only to the nuclear weapons, but also to the storage site.

Physical security within the Weapons Storage Area is provided by layers of protective methods such as fences; alarms and guards.

The physical security concept for protecting Peacekeeper Launch Facilities is the same as the existing Minuteman security concept. Security is provided by the vault characteristics of the launcher and sensors that detect intrusions when the Launch Facility is unmanned. If detection occurs, the security alert team takes action in accordance with techniques as prescribed by approved procedures. The security system is capable of detecting unauthorized access or intrusion in any or all weapon system facilities where nuclear materials are located. Security teams are present at the Launch Facility when it is opened. Additionally, a security force is present in the convoy whenever nuclear weapons are transported.

#### **1.6.10.5.3    Personnel Reliability Program**

To prevent deliberate acts which could lead to an explosive detonation, all personnel assigned to nuclear weapons storage sites are evaluated under the criteria specified in AFR 35-99, Personnel Reliability Program. This program is designed to ensure that personnel with unique military functions have no medical or mental traits that are, or might be, a threat to the national security of the United States. The Personnel Reliability Program is designed to ensure very high standards of individual reliability in those whose duties are associated with nuclear



weapons and nuclear components. Only those who demonstrate unswerving loyalty, integrity, trustworthiness, and discretion are assigned such duties. Candidates must meet all requirements of the Personnel Reliability Program before they may perform duties associated with nuclear weapons. These requirements include position designation, security clearance, and screening. In addition, personnel are evaluated continuously over the entire period of their assignment to nuclear weapons-related work. The program promptly eliminates unqualified personnel from such positions.

#### **1.6.10.5.4 Transportation of Nuclear Weapons and Peacekeeper Stages**

Transporting of nuclear weapons (or weapon components) as part of Peacekeeper will occur when they are:

- o Delivered to the Weapons Storage Area initially or returned to the Department of Energy. These movements will normally be via road, rail, or air. Ground shipments must comply with Department of Transportation regulations. Military air shipments must comply with DoD directives and Air Force regulations to minimize shipping hazards.
- o Taken from or returned to storage at the Weapons Storage Area for assembly into reentry vehicles or deployment modules, or for surveillance or inspection.
- o Transported between the Weapons Storage Area and Launch Facility when a missile is deployed or removed from service. These movements are made on special transport vehicles. They will move under armed escort and only during daylight hours.

The most probable occurrence of an accident in the Weapons Storage Area would occur during handling. However, the weapons have been tested to verify that they meet "drop test" requirements without ignition of the explosive. The weapons are static grounded at all times, even during transfers from the storage structure onto the transporting vehicle. Prior to transport of the stages and reentry vehicles, drivers are certified, weather and road conditions are checked, coordination is accomplished with local law enforcement agencies, and other specific security precautions are taken in accordance with established convoy procedures as applicable. Should a mishap occur during transport, these personnel would provide the interface with civilian populace control.

All vehicles utilized in moving nuclear weapons and missile stage components must meet strict design criteria and be nuclear certified for that purpose. Ballistic Missile Office 80-1A (which implements Air Force Regulation 122-3, the Air Force Nuclear Safety Certification Program) describes the Peacekeeper nuclear certification program and identifies the program responsibilities, equipment to be certified, and the certification procedures.

#### 1.6.10.5.5 Maintenance and Quality Control

Safety is a critical aspect of all Peacekeeper maintenance activities. All work on the missile system is accomplished by highly trained and qualified maintenance technicians. A special Training Control Division schedules, monitors, and controls all training (job qualification, upgrade training, special technical training programs, recurring training, and management training).

This comprehensive training ensures only the most highly trained and qualified personnel are used to perform work on the weapon system. Teams which are required to handle critical resources receive special task certifications and qualification. All work is performed in compliance with approved and standardized Technical Orders. In addition a comprehensive quality control program reviews maintenance operations by evaluating and inspecting personnel, procedures, equipment, facilities, and technical data. This division works directly for senior management and is made up of personnel (usually senior noncommissioned officers and commissioned officers) selected on the basis of their technical job knowledge, administrative competence, communication skills, temperament, and sound judgement. The inspection and evaluation team perform periodic and "no-notice" maintenance and technical inspections. A dedicated staff of safety professionals and specialists, complemented by senior staff members and field supervisors, ensure safety is foremost in all maintenance operations. All applicable Occupational Safety and Health Administration standards and specially developed Air Force Occupational Safety and Health standards are strictly enforced.

#### 1.6.10.6 Radiation and Toxic Substances

The normal exposure of weapons personnel to radiation has been measured and found to be well within established federal exposure standards. The weapons are constructed and maintained to preclude the possibility of leakage of radioactive material during operational status. No hazard from intrinsic radiation exists for civilians or military personnel including those who are part of nuclear weapons operations.

Some flammable and toxic substances (i.e., lubricants, cleaning solvents, etc.) may be used in limited quantities in the maintenance of weapons, but this is little different from many industrial operations where proven procedures have been adopted to ensure both worker and public safety. The one possibility of an accident involving toxics would be puncture of the sealed containers of the liquid propellant stage which contains N<sub>2</sub>O<sub>4</sub> and MMH. MMH is a volatile caustic liquid which can cause a toxic reaction by inhalation or absorption through the skin. The Threshold Limit Value for MMH is 0.2 parts per million with a 10-minute emergency exposure level of 30 parts per million. The material produces respiratory irritation as well as systemic central nervous system effects. The Threshold Limit Value for 8-hour exposure to N<sub>2</sub>O<sub>4</sub> is 5 parts per million with a 10-minute emergency exposure limit of 30 parts per million. N<sub>2</sub>O<sub>4</sub> causes severe burns on contact with skin but is much more toxic when inhaled. Severe symptoms can develop many hours after exposure and are mainly respiratory in nature. The containers are separate from each other and are hermetically sealed at the factory and never opened. MMH is a particularly toxic substance, and were a leak to occur, extreme care would have to be taken. A decontamination plan regarding a possible spill has been developed by the manufacturer. This plan delineates the general criteria for dealing with a transportation/handling mishap. The plan specifies potential hazard criteria and specific actions to prevent or respond to mishaps. The procedures include diluting the materials with water which serves both to reduce the hazard due to contact and prevents release of vapors into the atmosphere. Equipment required for emergency response includes Department of Transportation approved containers to transport contaminated waste to approved disposal sites. In addition, "leak detector ports" are designed into storage and transportation facilities and containers to sample the air prior to opening or entering an enclosed area containing a

liquid propellant motor. If the air sample indicates the presence of toxic vapor, the container or facility is kept closed and a special, preselected and trained decontamination team will be dispatched from the maintenance depot along with special equipment designed for emergency cleanup operations. The team is available to respond to a mishap at any time.

#### **1.6.10.7     Hazardous Wastes**

F.E. Warren is currently a small quantity generator of hazardous waste as defined in 40 CFR 261.5. The deployment and operation of the Peacekeeper system is not expected to generate any significant amounts of additional hazardous or acutely hazardous wastes which would cause their status to change. Potential sources of waste include expended or unuseable fuels, oils and lubricants, solvents, paints and thinners, hydraulic and machine fluids, cleaning agents, and adhesives. Other types of hazardous waste include spent lithium batteries, lead batteries and their electrolyte. These types of wastes are similar to what is currently being generated. If the amounts of waste generated exceed the quantities allowed for small quantity generators, the wastes will be handled and controlled as specified in 40 CFR, Parts 262 through 265, 270 and 124, and the notification requirements of Section 3010 of the Resource Conservation and Recovery Act of 1976.

The special nuclear materials incorporated into the Peacekeeper warheads are not sources of hazardous wastes within the meaning of the Resource Conservation and Recovery Act of 1976, as amended. Wastes from such materials are handled and disposed of in accordance with regulations established by the Department of Energy. None will be produced and stored at F.E. Warren AFB or in the Deployment Area as a result of this project.

#### **1.6.10.8     Air Force Contingency Plans**

The DoD requires that a comprehensive systems safety hazards analysis addressing all potentially hazardous elements of the Peacekeeper missile system be accomplished prior to deployment. The various DoD, Air Force, and other agency directives regulating the scope and content of the specific sections of this analysis have been identified in previous subsections of this section. These directives provide for the following:

- 1) Identification of hazard by category (e.g., explosive, chemical, nuclear);
- 2) Systems analysis concerning potential effect of the subject hazardous elements on personnel and resources given various mishap scenarios;
- 3) Safety criteria pertaining to the use and handling of hazardous materials; and
- 4) Studies and reviews to ensure that the weapon system design features and procedural safeguards are adequate to meet all DoD and Occupational Safety and Health Administration safety standards.

The above is instrumental in the preparation of plans to address potential mishaps. This overall iterative process is initiated during the system concept phase and continues throughout the life cycle of the program.

The specific plans for response to accidents involving the Peacekeeper missile associated hazards are contained in Air Force Regulations 122-23, 122-25, 1274, 355-1, Strategic Air Command Regulations 207-18 and 355-1, and the Ogden Air Logistics Center Peacekeeper Recovery Plans which are still being developed. The specific response, aimed at protecting civilian and Air Force personnel and property, would vary with the facts of an incident, but would contain the following elements as appropriate:

- 1) An onsite team chief would assume and maintain control of the site;
- 2) Appropriate local agencies would be advised, and all responses would be coordinated with those agencies;
- 3) All personnel would be evacuated to a predetermined distance depending on the nature of the mishap; and
- 4) A Base Disaster Control Group composed of safety, medical, and maintenance personnel and bioenvironmental engineers and other personnel from the base would be dispatched to the accident scene as necessary.

In the unlikely event that cleanup activities would involve the components of the reentry vehicle, the Defense Nuclear Agency and the Department of Energy would also be involved.

#### **1.6.11 Authorizing Actions**

Certain project facilities and activities will require a variety of authorizing actions, i.e., permits, approvals, and consultations. Discharges to air and water and disposal of solid and hazardous waste will be permitted in accordance with state and federal law prior to construction. State and local road permits needed for delivery of Peacekeeper missile stages to F.E. Warren AFB and their movement to and from the Deployment Area will be obtained as required. A list of such authorizing actions and the agencies involved, along with corresponding descriptions of the relevant facilities or activities is set forth in Appendix E of this volume.

#### **1.7 Mitigation Planning Efforts**

Mitigation planning is an essential element of the Air Force Environmental Impact Analysis Process and represents an ongoing effort of appropriate Air Force and agency management functions to establish mechanisms to limit project impacts.

Under the Memorandum of Agreement between the Secretary of Defense and the Governors of Wyoming and Nebraska, a Mitigation Agreement will be developed after filing the FEIS. This agreement will set forth specific measures to be undertaken by DoD within its existing authority to mitigate adverse impacts resulting from the Peacekeeper project. The Mitigation Agreement will also contain a plan for mitigation measures and funding that are beyond DoD authority. The DoD will support such requests for measures contained in the Agreement before other federal agencies.

Additionally, mitigation planning will occur in response to other regulatory requirements applicable to this project. This includes the Endangered Species Act and the National Historic Preservation Act both of which require study and resulting affirmative actions to limit the impacts on the sensitive resources.

Within this FEIS the Air Force has committed to certain mitigations (within the constraints posed by schedule, budget limitations, and mission requirements) and has assumed the application of these within the impact analyses (Section 3.X.X.4). Additionally, mitigations have been suggested (Section 3.X.X.6) which may be implemented, either by the Air Force or others, to further reduce impacts. These mitigations in many cases require the refinement of project impacts to better evolve mitigation strategies and requirements. Monitoring programs may be appropriate throughout the project construction and Assembly and Checkout period to better identify variations to project impacts and to provide refinement of mitigation actions. Those monitoring requirements which directly support impact mitigations have been suggested within the mitigation sections of the appropriate resource sections.

## **2.0        AFFECTED ENVIRONMENT**

This section presents a systematic description of existing environmental conditions in the project area. Existing environmental conditions form the background against which impacts of the Proposed Action can be considered (Section 3.0).

### **2.1        Human Resources**

#### **2.1.1      Employment Demand**

The analysis of employment demand describes the regional economy and area demographics. An historic profile of population, labor force participation, unemployment, and income was developed and used to forecast future activity in order to determine what labor force is available for work on the project. Demand for project employment was then compared with available labor in order to determine what resources are required and the levels of immigration expected.

The information in this section is based upon data and detailed analysis contained in the Socioeconomics Environmental Planning Technical Report.

##### **2.1.1.1    Region of Influence, Data Sources, and Analytic Methods**

###### **2.1.1.1.1    Region of Influence**

The employment demand analysis considers a Region of Influence which includes 16 counties in Nebraska, Wyoming, and Colorado (Figure 2.1.1-1). These counties are: Albany, Goshen, Laramie, and Platte, Wyoming; Kimball, Banner, and Scotts Bluff, Nebraska; and Adams, Arapahoe, Boulder, Denver, Douglas, Gilpin, Jefferson, Larimer, and Weld, Colorado.

The Region of Influence is delineated on the basis of a 60-mile radius surrounding F.E. Warren AFB. This defines an area where the project can draw a local (daily commuting) labor force. Because this radius extends into the Denver metropolitan area, the entire Denver Standard Metropolitan Statistical Area is included, due to its role as a regional distribution and service center. The 60-mile factor was derived from a review of construction projects of similar magnitude in and around Wyoming, Nebraska, North Dakota, and Colorado (Dunning 1981, Coon et al. 1976, and Battelle 1979).

An Area of Concentrated Study within the Region of Influence is derived to include the following: Goshen, Laramie, and Platte counties, Wyoming, and Kimball and Scotts Bluff counties, Nebraska. This Area of Concentrated Study is based on impact-associated population allocations to communities in those counties as shown in Table 3.1.1-7. For a more detailed justification of the Area of Concentrated Study, see Section 3.1.1.1.

###### **2.1.1.1.2    Data Sources and Analytic Methods for Existing Conditions**

###### **2.1.1.1.2.1    Data Sources**

The regional Economic Information System of the U.S. Bureau of Economic Analysis provided historical time series data for employment and personal income. Population is derived using data from the U.S. Census Bureau and the Bureau of Economic Analysis. The survey results from the "Economic Base Analysis of Laramie County, Wyoming" were used to augment Bureau of Economic Analysis and Census Department data for that county. Agencies contacted

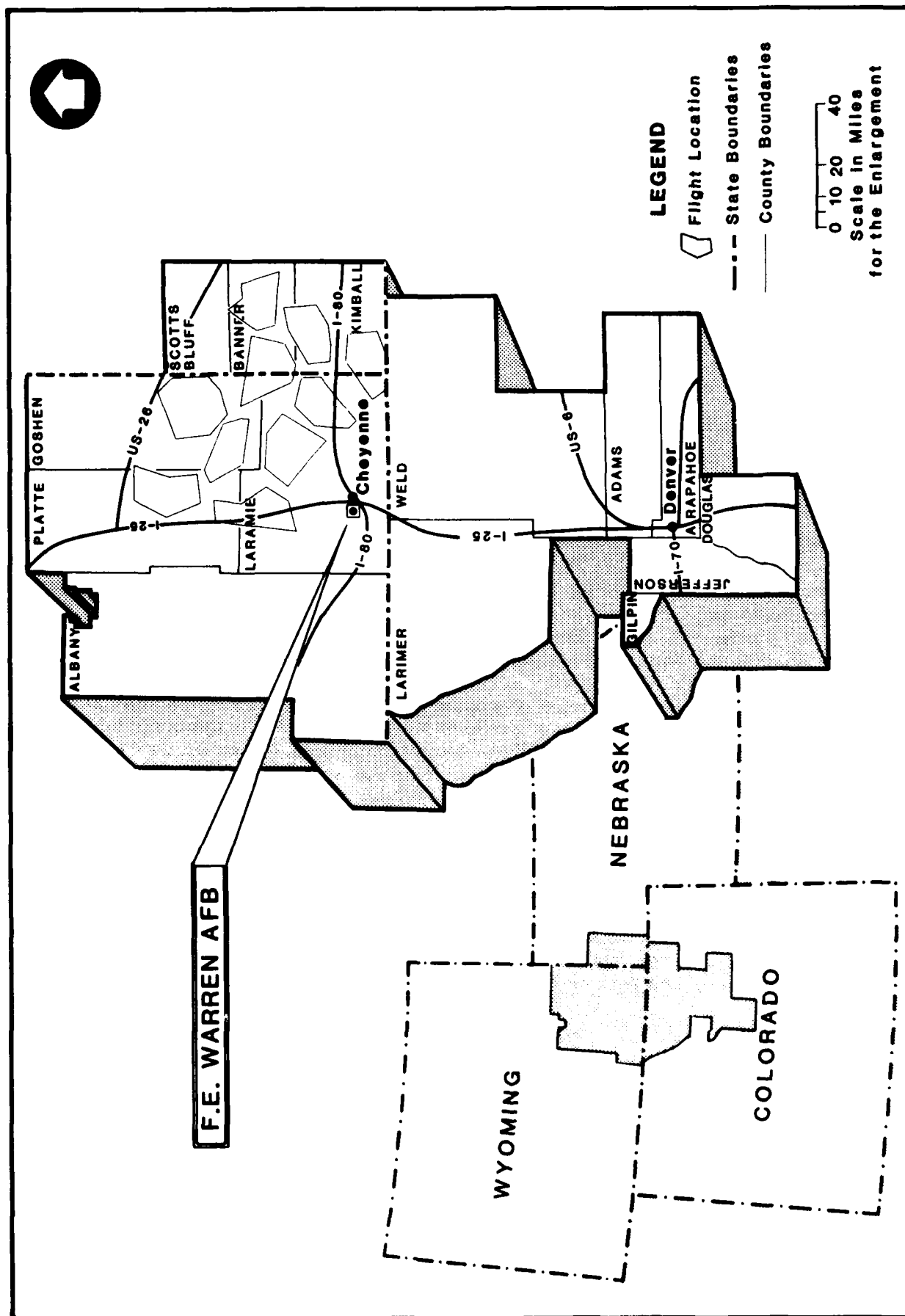


FIGURE 2.1.1-1 REGION OF INFLUENCE FOR EMPLOYMENT DEMAND AND CONSTRUCTION RESOURCES

included the Wyoming Industrial Siting Administration, The State Employment Security Administration, the Construction Trades Unions Council and the Associated General Contractors for Southeast Wyoming.

#### 2.1.1.1.2.2 Analytic Methods for Existing Conditions

The existing conditions section provides a profile of economic characteristics. This profile was developed using secondary data sources.

#### 2.1.1.2 Existing Conditions

Regional employment trends are summarized in Table 2.1.1-1. These data were aggregated at the county level from the Bureau of Economic Analysis and the respective states' employment security agencies. Employment by place of work, as reported by the Bureau of Economic Analysis, includes all employment (full and part time) in the county where the employer is located. Employment by place of residence is reported by county of residence of the employee and includes employment covered by unemployment legislation.

The region experienced strong employment growth between 1970 and 1980. Regional employment was approximately 710,000 in 1970, and over 1 million by 1980, showing an annual growth rate of 5.7 percent. The gross Labor Force Participation Rate was somewhat higher at the regional level than in the local area around F.E. Warren AFB. In 1970, it was 42 percent in the region, and in 1980, 52 percent. Nationally, a similar trend has occurred. This is because of the increased number of women who have entered the labor force.

In 1975, the peak year for national unemployment during the 1970s, the unemployment rate reached 7.8 percent. This was also the peak year for the region with a 5.0-percent rate. The peak seasonal rate reached 8 percent in the winter of 1982 to 1983, and the unemployment rate in some counties has recently approached 12 percent. Regional unemployment rates generally reflected national rates, while averaging about 2 percent below the national rates.

The income statistics were derived from estimates of personal income by the Bureau of Economic Analysis. In 1980, total real personal income increased to approximately \$26 billion. This represents a 75-percent increase over 1970.

Table 2.1.1-1

## HISTORICAL ECONOMIC DATA FOR THE 16-COUNTY REGION

Year	Population	Households	Labor Force	Gross <sup>1</sup> LFPR	Resident Employment	Unemployed Workers
1970	1,572,300	497,260	667,290	42.4	645,792	21,500
1971	1,627,700	521,790	699,280	43.0	677,908	21,369
1972	1,696,500	553,020	763,240	45.0	741,424	21,811
1973	1,760,000	584,340	816,570	46.4	793,711	22,863
1974	1,796,200	605,700	839,950	46.8	812,293	27,659
1975	1,820,600	623,440	853,910	46.9	811,383	42,525
1976	1,860,500	648,690	883,400	47.5	842,971	40,431
1977	1,909,500	674,880	931,840	48.8	892,008	39,836
1978	1,969,900	710,510	1,001,190	50.8	967,996	33,191
1979	2,030,800	742,150	1,051,560	51.8	1,020,760	30,799
1980	2,068,600	766,910	1,081,230	52.3	1,045,199	36,034
1981	2,115,520	786,990	1,104,030	52.2	1,061,028	42,999
1982	2,171,920	819,610	1,119,190	51.5	1,072,337	46,849

Year	Unemp. Rate	Employment by Place of Work	Earnings (Millions of Current \$)	Earnings (Millions of 1982 \$)	Earnings per Worker (Current \$)
1970	3.22	704,618	5,275.8	11,749.3	7,500
1971	3.06	739,981	5,949.3	12,700.1	8,000
1972	2.86	788,830	6,821.8	14,052.9	8,600
1973	2.80	847,572	7,803.0	15,207.3	9,200
1974	3.29	864,154	8,602.6	15,224.6	10,000
1975	4.98	872,576	9,281.6	15,259.5	10,600
1976	4.58	904,334	10,328.1	16,154.7	11,400
1977	4.27	958,161	11,649.6	17,227.7	12,200
1978	3.32	1,031,547	13,623.4	18,822.4	13,200
1979	2.93	1,091,146	15,667.8	19,861.9	14,400
1980	3.33	1,117,546	17,647.5	20,286.8	15,800
1981	3.89	1,151,181	19,999.6	21,182.1	17,400
1982	4.19	1,155,481	20,963.5	20,963.5	18,100

Year	Personal Income (Millions of Current \$)	Personal Income (Millions of 1982 \$)	Personal Income Per Capita (Current \$)	Personal Income Per Capita (1982 \$)
1970	6,555.1	14,598.5	4,200	9,300
1971	7,356.1	15,703.3	4,500	9,600
1972	8,341.7	17,184.0	4,900	10,100
1973	9,533.5	18,579.9	5,400	10,600
1974	10,672.4	18,887.7	5,900	10,500
1975	11,700.0	19,235.5	6,400	10,600
1976	13,031.1	20,382.7	7,000	11,000
1977	14,665.9	21,688.2	7,700	11,400
1978	16,988.4	23,471.6	8,600	11,900
1979	19,605.0	24,853.0	9,700	12,200
1980	22,304.4	25,640.1	10,800	12,400
1981	25,484.2	26,991.0	12,000	12,800
1982	26,582.1	26,582.1	12,200	12,200

<sup>1</sup> Gross Labor Force Participation Rate (LFPR) = Unemployment plus Employment divided by Population.



## **2.1.2     Housing**

The housing resource describes the existing housing stock, including single family, multifamily, mobile homes, and temporary housing accommodations within the Region of Influence. The resource analysis includes consideration of banking and financial institutions; federal, state, and local governments; and the private housing industry (land developers and home builders) and their capabilities to respond to changes in demand.

The information in this section is based upon data and detailed analysis contained in the Housing Environmental Planning Technical Report.

### **2.1.2.1     Region of Influence, Data Sources, and Analytic Methods**

#### **2.1.2.1.1     Region of Influence**

The housing Region of Influence includes six counties in Wyoming and Nebraska (Figure 2.1.2-1). They are: Goshen, Laramie and Platte counties in Wyoming, and Banner, Kimball, and Scotts Bluff counties in Nebraska.

The housing Area of Concentrated Study is the Cheyenne Urban Area; Chugwater, Pine Bluffs, and Wheatland, Wyoming; and Kimball, Nebraska. The Cheyenne Urban Area includes the Cheyenne Census Division, F.E. Warren AFB, and the Urban Fringe parts of Cheyenne East and West divisions. The housing resource Region of Influence and Areas of Concentrated Study are derived from the assumptions involved in allocating the population and employment described in Section 2.1.1.1.1, and justified on the basis of relative increases in population (Section 3.1.2.1).

#### **2.1.2.1.2     Data Sources and Analytic Methods for Existing Conditions**

Data collection included the use of primary and secondary sources. Primary sources included interviews with local property owners and real estate managers and field surveys of existing housing stock to obtain detailed information regarding housing conditions, dwelling types, rates, and occupancy levels. Interviews with financial institutions were also conducted to determine the historical levels of home mortgage and construction activity and local developer capabilities. In addition, contacts with federal, state, and local housing agencies and authorities were made as a supplementary measure to update historic housing data. Secondary sources included census information, housing monitoring surveys, and building permit data which assisted in profiling local housing conditions.

Data developed and analyzed from primary and secondary sources were used to profile housing supply in the Region of Influence. The existing housing conditions and trends include a 10-year analysis of housing mix, vacancy rates, value, and utilization. Mortgage financing capabilities, government permit processing, and builder and developer capabilities were analyzed to determine existing and historic levels of development activity.

### **2.1.2.2     Existing Conditions**

#### **2.1.2.2.1     Cheyenne Urban Area**

Year-round housing stock in the Cheyenne Urban Area grew by over 95.34 units, or 61 percent, between 1970 and 1980 as shown in Table 2.1.2.1. The total county housing stock increased 40 percent. Approximately 92 percent of all year-round housing units in Laramie County are in the Cheyenne Urban Area. The remainder are in the small communities of Albin, Burns, and Pine Bluffs, and on scattered farms and ranches throughout the county.

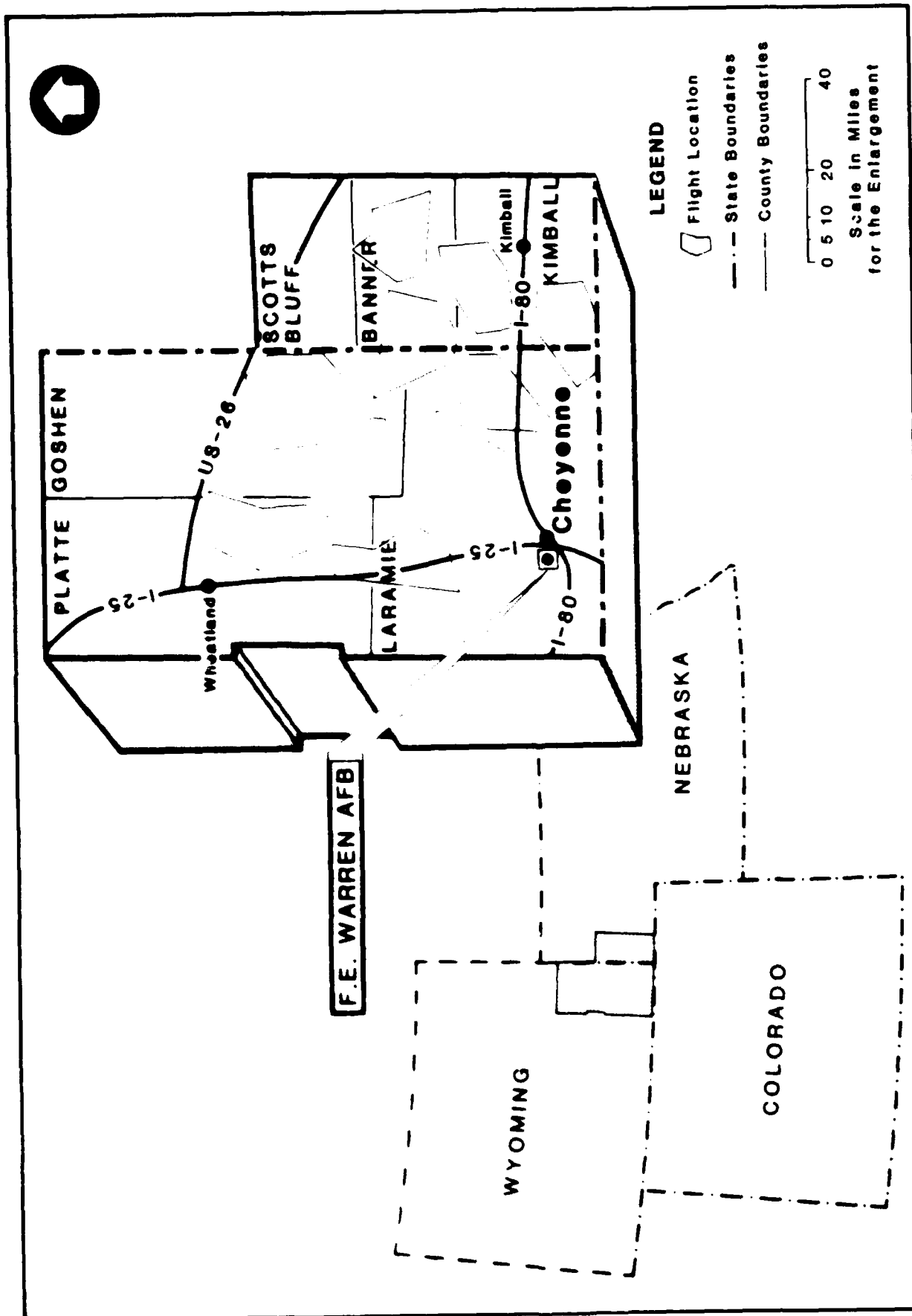


FIGURE 2.1.2-1 REGION OF INFLUENCE FOR HOUSING, PUBLIC FINANCE AND SOCIAL WELL-BEING

Table 2.1.2-1

**HOUSING MIX, 1970 AND 1980, CHEYENNE URBAN AREA, CITY OF CHEYENNE,  
SOUTH CHEYENNE, AND LARAMIE COUNTY, WYOMING**

Type of Structure	1970		1980		Change 1970/1980	
	Units	Total	Units	Total	Units	Change
<b>Cheyenne Urban Area<sup>1</sup></b>						
Single Family	N/A	N/A	17,083	68%	N/A	N/A
Multifamily	N/A	N/A	5,582	22%	N/A	N/A
Mobile Home	N/A	N/A	2,502	10%	N/A	N/A
TOTAL:	15,633	100%	25,167	100%	9,534	61%
<b>City of Cheyenne</b>						
Single Family	10,543	71%	14,100	72%	3,557	34%
Multifamily	4,108	28%	5,000	26%	892	22%
Mobile Home	172	1%	500	2%	328	191%
TOTAL:	14,823	100%	19,600	100%	4,777	32%
<b>South Cheyenne<sup>2</sup></b>						
Single Family	N/A	N/A	711	28%	N/A	N/A
Multifamily	N/A	N/A	170	7%	N/A	N/A
Mobile Home	N/A	N/A	1,611	65%	N/A	N/A
TOTAL:	810	100%	2,492	100%	1,682	208%
<b>Laramie County</b>						
Single Family	13,977	72%	18,720	69%	4,743	34%
Multifamily	4,659	24%	5,835	21%	1,176	25%
Mobile Home	780	4%	2,720	10%	1,940	249%
TOTAL:	19,416	100%	27,275	100%	7,859	40%

<sup>1</sup> 1970 data for Cheyenne Urban Area include only the City of Cheyenne and South Cheyenne.

<sup>2</sup> South Cheyenne includes Fox Farm Census Designated Place and Orchard Valley Census Designated Place.

N/A Not available by unit type.

Source: U.S. Bureau of the Census, General Housing Characteristics, 1970 and 1980, U.S. Bureau of the Census, Wyoming Detailed Housing Characteristics, 1970, and 1980, U.S. Bureau of the Census, Tape STF1A, Census Retrieval and Information Service 1980

Since 1980, the housing stock in the Cheyenne Urban Area and county has not increased at historical 1970 to 1980 levels. Recent building permit data (1980-1982) indicate the area experienced a decline in housing construction due to economic conditions and high interest rates. Current data (1983) indicate a growth in housing starts for all housing categories.

The housing mix for the Cheyenne Urban Area presented in Table 2.1.2-1 indicates that single family units make up the largest housing category. In 1980, the Cheyenne Urban Area contained 91 percent of all single family units in the county, 96 percent of the multifamily units, and 92 percent of the mobile homes. Utilizing housing mix as an indication of housing preference, the 1970 and 1980 Census for Laramie County shows a preference change to mobile homes with percentage reductions in single family and multifamily.

Despite the growth in housing stock experienced in the Cheyenne Urban Area, the total vacancy rate declined approximately 1 percent according to 1970 and 1980 Census data. Total vacancy rates have fluctuated slightly from 1980 through 1982 for the Cheyenne Urban Area. In 1983 the total vacancy rate as defined by the Federal Home Loan Bank of Seattle was 2.4 percent.

Housing values for the Cheyenne Urban Area rose substantially between 1970 and 1980, from \$24,616 (adjusted for 1982 constant dollars) to \$55,600. Median monthly rent in 1970 was \$159 (adjusted for 1982 constant dollars) and increased in 1980 to \$191. The average price for residential units in late 1982 was \$63,666.

According to 1983 survey data, 57 mobile home parks and 6 campgrounds containing over 2,300 and 372 spaces, respectively, are located in the Cheyenne Urban Area. Mobile home parks represent less than a 2-percent total vacancy rate, with campgrounds showing a total vacancy rate of 20 percent. The inventory of multifamily housing identified 13 apartment complexes in the area, which contain approximately 900 units and list a total vacancy rate of 4 percent. The 1983 inventory of temporary housing also identified 29 hotels in the Cheyenne Urban Area, of which 21 are nonfranchised and account for 987 rooms and 1,389 beds. The franchised hotels account for 1,145 rooms and 1,850 beds.

#### 2.1.2.2 Town of Pine Bluffs

The town of Pine Bluffs contained approximately 457 housing units as of September 1983. Eighty percent or 366 units were single family, 10 percent or 46 units were multifamily, and 10 percent or 45 units were mobile homes. Based on interviews with local officials, vacancy rates by housing type are estimated as follows: single family - 10 percent, multifamily - 6 percent, mobile homes - zero. The 1980 Census and a 1983 survey of housing conditions revealed that over 90 percent of the housing structures in the town are considered standard. One mobile home park/campground which contains 90 spaces (30 mobile home park, 60 campground) exists in town. Two motels containing 48 rooms offer temporary accommodations.

#### 2.1.2.3 Town of Wheatland

Year-round housing stock in Wheatland increased by 1,400 units from 1975 to 1980. This was largely attributable to construction activities of the Mountain Basin Project. Since 1980, housing stock has experienced a reduction from a total of 2,177 to an estimated 1,000 units. This reduction is almost entirely from the mobile home category. The 1983 housing stock is estimated at 56 percent single family, 24 percent multifamily, and 20 percent mobile home.

Based on estimates of 1983 vacancies, the highest vacancy rate by type of unit is 32 percent for mobile homes. This rate has increased from the 11-percent level experienced at the time of the 1980 Census. The single family vacancy rate is estimated at 9 percent while multifamily vacancies of 74 units identify a rate of 21 percent.

The Wyoming Department of Economic Planning and Development indicated that the average sales price in 1982 for single family housing for Wheatland and Platte County was \$59,132. The average sales price for manufactured homes on the same date was \$16,344. Apartment rents averaged \$245 per month for the second quarter of 1982.

According to 1983 survey data, 4 mobile home parks and 1 campground containing 642 and 42 spaces, respectively, are located in Wheatland. Mobile home parks represent an 80-percent vacancy rate with the campground showing a vacancy rate of 25 percent. The 1983 inventory of temporary housing identified 7 hotels in Wheatland, of which 4 are nonfranchised and account for 61 rooms and 100 beds. The franchised hotels contain 119 rooms and 179 beds. The inventory of multifamily housing identified two apartment complexes in the area. These contain 92 units and list a total vacancy rate of 60 percent.

#### 2.1.2.2.4 Town of Chugwater

The town of Chugwater contained approximately 96 housing units as of November 1983. Housing stock has decreased by 13 units since 1976 with small growth in single family and reductions in mobile homes and multifamily. Seventy-four percent of the housing stock has been identified as single family, 9 percent multifamily, and 17 percent mobile home. Vacancy rates and vacancies by housing type as of November 1983, have been identified as follows: single family - 14 percent or 10 units, multifamily - 78 percent or or add vacant mobile home spaces 7 units, mobile homes - zero or 0 units. One mobile home park (8 spaces of which 6 are vacant) and 4 hotels containing 35 rooms are located in the town.

#### 2.1.2.2.5 City of Kimball

Year-round housing stock in Kimball increased 12 units, or 1 percent between 1970 and 1980. Single family housing stock decreased by 17 units, or 2 percent for the same period. Multifamily units declined by 2 units, or a 1-percent change. Mobile homes increased by 27 percent from 113 units in 1970 to 144 units in 1980.

Single family units comprise 73 percent of all housing units in the city. Multifamily and mobile homes number 18 percent and 9 percent of the housing stock, respectively. Between 1970 and 1980, there has not been a substantial shift in the housing mix. Mobile home units showed the only positive change, increasing from 9 percent to 11 percent of the total housing stock.

According to census information, the highest vacancy rate by type of unit was 16 percent for multifamily units. Although the largest number of vacant units was found to be single family, the rate was only 6 percent. Mobile homes, the only housing type to show growth from 1970 to 1980, experienced a 6-percent vacancy rate in 1980. The overall vacancy rate for the city in 1980 was 8 percent, identical to the 1970 rate.

The median value of owner-occupied housing for the city of Kimball was \$11,200 in 1970 and by 1980 increased to \$11,800. After adjusting for inflation, constant 1980 dollars, housing value have appreciated approximately \$10,000 during the 10 percent increase. 1980 state data indicate an average sales price of \$25,846. The median of the 10 percent increase increased from \$74 in 1970 to \$118 in 1980.

According to 1983 inventory data collected, 2 mobile home parks and 2 campgrounds containing 162 and 71 spaces, respectively, are located in Kimball. Mobile home parks represent less than a 25-percent vacancy rate, with campgrounds showing a vacancy rate of 89 percent. The 1983 inventory of temporary housing identified 8 hotels in Kimball, of which 3 are nonfranchised and account for 75 rooms and 179 beds. The franchised hotels contain 151 rooms and 190 beds. No apartment complexes containing ten or more units were identified in Kimball.

### **2.1.3      Public Finance**

The public finance resource examines the budgets, fiscal resources, and obligations of all major governmental entities, including school districts and urban service areas projected to receive major population allocations as a result of project-related impacts.

The information in this section is based upon data and detailed analysis contained in the Socioeconomic Environmental Planning Technical Report.

#### **2.1.3.1      Region of Influence, Data Sources, and Analytic Methods**

##### **2.1.3.1.1      Region of Influence**

The public finance Region of Influence is the six-county region described earlier under the Region of Influence for housing. The justification for the public finance Region of Influence is identical to the housing Region of Influence justification (Section 3.1.2.1).

The Area of Concentrated Study for public finance focuses on Platte and Laramie counties, and the towns of Wheatland, Chugwater, Cheyenne, and Pine Bluffs, Wyoming; Kimball County and the city of Kimball, Nebraska; as well as various special district governmental jurisdictions. These jurisdictions receive the greatest population allocations relative to their size, and are discussed in Section 3.1.3.1.

##### **2.1.3.1.2      Data Sources and Analytic Methods for Existing Conditions**

Annual budgets for governmental entities were the major data sources utilized. Additional data sources included annual financial reports, financial statements, and reports from state education, revenue, and taxation departments. Where local data were unavailable, budget summaries at the state level were utilized. Certificates of taxes levied and abstracts of assessed valuation were utilized to determine existing mill levies and property valuations.

Actual 1981, 1982, and 1983 revenues for each jurisdiction were identified by revenue source. Interest income and cash balances were also identified. Expenditures were identified and aggregated by major categories specific to the type of services provided by each jurisdiction.

#### **2.1.3.2      Existing Conditions**

##### **2.1.3.2.1      Laramie County**

Total revenues for Laramie County in 1982 were \$9,323,896, a 17-percent average annual increase since 1980. Total expenditures were \$8,412,319 or an average annual increase of approximately 23 percent since 1980, leaving a surplus of \$911,577. The major revenue sources for the County in 1982 were the county's share of the 3-percent state sales and use tax and the 1-percent local option sales and use tax, and the severance tax transfer from the State. Property tax revenues have not increased substantially since 1980. The County's assessed valuation in 1982 was \$225,718,250. In fiscal year (FY) 1982, Laramie County had 100 percent of its \$4,514,365 general obligation bonding capacity available.

##### **2.1.3.2.2      City of Cheyenne**

Total revenue for the City of Cheyenne exclusive of the 1-percent sales and use tax carryover amount in 1982 was \$23,137,992 or an average annual increase of approximately 27 percent since 1980. The major revenue sources for the City include the City's share of 3-percent state and 1-percent local option sales tax, the mineral royalty, and the severance tax transfers from

the state. Expenditures in 1982 were \$22,217,403, representing an average annual increase of approximately 24 percent since 1980. Assessed valuation for the City of Cheyenne was \$121,677,236 in 1982. At the end of FY 1982, Cheyenne had approximately 53 percent of its bonding capacity available for debt service out of a legal debt limit of 4 percent of assessed valuation. Use of existing debt capacity is constrained by prevailing political attitudes, property assessment procedures which maintain property values at their 1967 market value, and low mill levy caps.

#### **2.1.3.2.3      Town of Pine Bluffs**

Pine Bluffs revenues declined from \$1,223,629 in 1981 to \$1,086,465 in 1983, an average annual decline of 6 percent. During the same period, expenditures declined at an average annual rate of approximately 18 percent from \$1,180,397 to \$767,895. If state and federal grants are excluded from nonenterprise fund revenues and expenditures, then adjusted revenues show an average annual increase of approximately 5 percent while expenditures fall by approximately the same amount. Major sources of revenue for Pine Bluffs consist of legislatively mandated state revenues followed by the local option 1-percent sales tax, user fees for community services, and property tax. Historically, property tax revenues have increased due to increasing assessed valuation. The mill levy has remained at the 8.0 level during the past 10-year period. Enterprise funds for water, sewer, trash, and electric service show consistently rising revenues and stable expenditures. The town has no general obligation bonded indebtedness. Enterprise fund indebtedness includes \$660,875 payable through the year 2010.

#### **2.1.3.2.4      Laramie County School District No. 1**

Laramie County School District No. 1 is the second largest school district in the state in terms of enrollment, and the lowest in terms of assessed valuation per average daily membership. Total general fund revenues for the District were \$44,443,666 in 1983, and total expenditures were \$39,317,781. These numbers represent general fund revenues and expenditures. If capital replacement and maintenance expenditures are included, they begin to approach existing revenues. Accordingly, the District has deferred capital maintenance and improvements during the past 5 years due to its constrained ability to fund such projects. As a result, through 1983 the District was in critical financial condition. Revisions to the State Foundation Program in 1983 provided the District with an additional \$8.37 million from this source with which some of these needs can now be addressed. At the beginning of FY 1984, the District had less than 25 percent of its legal bonding capacity remaining with approximately \$16.6 million obligated out of a total limit of approximately \$20.3 million.

#### **2.1.3.2.5      Laramie County School District No. 2**

Laramie County School District No. 2 serves the largely rural portion of eastern Laramie County. In 1980, the District had the fourteenth lowest assessed valuation per average daily membership in the state. In FY 1982 total revenues were \$4,378,885 and expenditures were \$3,644,226. The District has one outstanding general obligation bond due to be retired in 1989. As a result of changes in the State Foundation Program, revenues from this source are expected to increase by almost \$600,000 in FY 1983. The District has been experiencing rapid increases in expenditures in the areas of instructional services.

#### **2.1.3.2.6      South Cheyenne Water & Sewer District**

The South Cheyenne Water & Sewer District is an urban service district which operates its own wastewater treatment facility, purchasing its water from the City of Cheyenne and distributing it through its transmission system. The South Cheyenne Water & Sewer District funds its



operation through property taxes and user fees. Expenditures and revenue in 1982 were \$599,541 and \$604,763 (not including cash balance), respectively, leaving an operating surplus of \$5,222.

#### 2.1.3.2.7 City of Cheyenne Board of Public Utilities

The Board of Public Utilities is an enterprise fund which finances its operations entirely through user fees. The waterworks fund portion of total revenues and expenditures in 1982 were \$3,944,302 and \$3,600,253, respectively. The Board of Public Utilities has recently undertaken a major expansion of its facilities through the Stage II Water Project, and is scheduling increases in fees and rates to cover increased debt and loan obligations.

The sewer fund portion of total revenues and expenditures in 1982 was approximately \$1.2 million and \$1.1 million, respectively. Total bonded indebtedness consisted of \$10,280,000 for water bonds and \$2,975,000 for sewer bonds. There is no legal bonding limit on water bonds. However, sewer bonding is restricted by a cap of 4 mills on assessed valuation. Remaining sewer bonding capacity in 1982 was approximately \$1.6 million.

#### 2.1.3.2.8 Platte County

Between FY 1980 and 1982 Platte County revenues have increased at a rate substantially in excess of that of expenditures. During this period, revenues rose from \$1,949,977 to \$3,284,872, an average annual increase of approximately 34 percent. At the same time, excluding a \$930,000 pass through for road construction for the Missouri Basin Power Plant, expenditures rose from \$1,615,626 in FY 1980 to \$1,928,914 in FY 1982, an average annual increase of approximately 9.6 percent. Platte County revenues have undergone some major shifts in the last 3 years. Own-source revenues have increased rapidly from \$542,811 in FY 1980 to \$1,604,913 in FY 1982, a three-fold increase. State and federal revenue sources have increased at the average rate of 4 percent and 16 percent, per annum, respectively. In FY 1982 own-source revenues accounted for 51.1 percent of total revenues, up from 27.8 percent in FY 1980. Property tax collections, bolstered by increasing county assessments and mill levies, accounted for 87.4 percent of own-source revenues in FY 1982. However, property tax collections could decline in future years due to a reduction in the assessment factor for the Missouri Power Plant. In FY 1982, Platte County's mill levy was 7.65.

As noted above, adjusted expenditures increased at an average annual rate of approximately 11 percent between FY 1980 and FY 1982. If expenditures for road improvements for the Missouri Basin Power Plant are included, expenditures show an increase of approximately 39 percent per year. Because these road improvements represented an extraordinary expense for which the County was reimbursed, the approximate 11-percent per annum increase was taken as a realistic measure of expenditure trends. Public health expenditures increased by approximately 58 percent per year while general government expenditures rose by 17 percent per annum during this period. In FY 1982 general government expenses represented 23 percent of total expenditures.

In FY 1982 Platte County's bonded indebtedness of \$150,000 represented only 11 percent of the legal debt limit of \$1,509,285, leaving a legal debt margin of \$1,359,285.

#### 2.1.3.2.9 Town of Wheatland

Between FY 1981 and FY 1982 total revenues for the Town of Wheatland rose from \$1,115,808 to \$1,487,127, an annual increase of approximately 34 percent. During the same period expenditures rose from \$2,900,781 to \$1,211,439, an average annual increase of approximately 6 percent. Own-source revenues contributed 74.9 percent and 60.9 percent of total revenues

during FY 1981 and FY 1982, respectively. However, approximately 71 percent of own-source revenues were derived from utility enterprise funds in both years. The 3-percent sales and use tax, user fees and licenses, fees, fines, and permits are the principal sources of nonenterprise fund local revenue. Property tax collection totaled \$70,736 in FY 1982 or less than 4 percent of local revenue. State transfers are the second largest source of revenue for Wheatland, contributing over 1.3 million in FY 1981 and FY 1982. Within this category, mineral royalty and severance taxes contributed over \$760,000 during FY 1982, more than half the state-source total. Since FY 1982, federal transfers have been limited to general revenue sharing of \$32,728 and \$19,670 in FY 1982 and FY 1983, respectively.

While total expenditures increased at an average annual rate of approximately 6 percent during the FY 1981 to FY 1982 period, general government expenditures increased approximately 20 percent due in part to the addition of a building inspector/planner to the town staff. Public safety, sanitation, and street expenditures declined at an average annual rate of approximately 5 percent, 7 percent, and 9 percent, respectively, while utility expenditures declined 7 percent. Wheatland has utilized 3 percent of its 1982 bonded debt capacity with FY 1982 bonded indebtedness totaling \$290,000.

#### 2.1.3.2.10 Town of Chugwater

The Town of Chugwater's budget is reported by its mayor to be approximately \$70,000. In 1982 its assessed valuation was \$489,655. The municipal mill levy of 3.3 mills generated property tax revenues of \$1,616. The Town's portion of the 3-percent and 1-percent local option sales and use tax accounted for an additional \$37,691 in revenues. The other major sources of revenue for the Town are own-source revenues and state transfers to the Town.

The Town's major expenditures are for road and street maintenance and salaries for the Town's two part-time employees, a maintenance person, and the Town clerk.

#### 2.1.3.2.11 Platte County School District No. 1

Platte County School District No. 1 provides educational services to the major portion of Platte County. In FY 1982, total revenues and expenditures were \$7,388,048 and \$7,655,519, respectively. The District had outstanding general obligation bonded indebtedness of \$1,095,000 in FY 1982, representing 7.7 percent of its legal debt capacity. Due to population fluctuations as a result of the Missouri Basin Power Plant construction and its rate of valuation for property tax assessment purposes, the District has been in an unstable position with respect to its revenue sources and student enrollment.

#### 2.1.3.2.12 Kimball County

Selected revenues identified for Kimball County were \$821,945 in 1982, representing a 10-percent increase over 1981. Expenditures were \$626,854 or an 7.5-percent increase over 1981, leaving a net surplus of \$195,000. Total assessed valuation in 1982 was \$204,129,273. Property tax revenues increased by 26 percent from 1981 to 1982. In 1982 Kimball County had 21 percent or \$1,683,000 of its bonded indebtedness capacity available.

#### 2.1.3.2.13 City of Kimball

In 1982 the City of Kimball had total revenues of \$1,011,111 and expenditures of \$753,058. The net surplus of all funds was \$255,411. The City's total assessed valuation was \$49,111,855. Bonded indebtedness was \$995,000 out of a legal debt limit of \$1,412,845.

#### **2.1.3.2.14 City of Kimball Combined Utilities Fund**

The Combined Utilities Fund is operated as an enterprise fund which finances its operation through user fees. Between FY 1982 and FY 1983 total revenues for the fund rose from \$1,389,102 to \$1,453,689, an increase of 4.6 percent, while expenditures fell from \$1,173,853 to \$1,155,605, a decrease of 1.5 percent.

Approximately 75 percent of total revenues and expenditures are attributable to the electric fund. Electric revenues are increasing due to rate changes while sewer and water revenues are decreasing due to population losses resulting in declining sales of water. Expenditures are stable or falling slightly.

The Combined Utilities Fund has long-term bonded indebtedness of approximately \$2,130,000 payable through March 1, 1998. The most recent bond issue was committed in March 1982 in the amount of \$800,000 to finance electrical improvements.

#### **2.1.3.2.15 Kimball County High School District No. 1**

Total revenues and expenditures in 1982 for Kimball County High School District No. 1 were \$993,335 and \$969,977, respectively, leaving a net surplus of \$23,358. The District had no bonded indebtedness in 1982.

#### **2.1.3.2.16 Kimball County Elementary School District No. 3**

Total revenues and expenditures in 1982 for Kimball County Elementary School District No. 3 were \$1,699,049 and \$1,307,762, respectively, leaving a net surplus of \$391,187. The District had no bonded indebtedness in 1982.

## 2.1.4 Construction Resources

This section of the report delineates the Region of Influence, lists data resources and develops a profile of existing conditions regarding construction materials required by the project. Data in this section are based on detailed analyses found in the Socioeconomics EPTR.

### 2.1.4.1 Region of Influence, Data Sources and Analytic Methods

#### 2.1.4.1.1 Region of Influence

For purposes of analysis the Region of Influence and the Area of Concentrated Study are considered to be identical. Justifications for determining the 16 county Region of Influence are identical to those used in Employment Demand, Section 2.1.1.1. However, construction material purchases may also take place outside the Region of Influence in a national market. Other project material purchases may take place within the Cheyenne Urbanized Area.

#### 2.1.4.1.2 Data Sources and Analytic Methods for Existing Conditions

Data sources include publications of the U.S. Bureau of Mines, state and local agencies and discussions with trade organizations and major material producers. Data on availability of materials in the Region of Influence are shown in Table 2.1.4-1 for 25 major categories. In this table an anticipated project materials list is shown. The materials are grouped by Standard Industrial Classification (SIC) codes (Column 1) while estimated 1982 purchases, in the Region of Influence, are indicated in (Column 2). These purchases (sales) constitute an estimate of materials "availability". For example, in 1982 purchases of fabricated structural metal totaled \$46,255,000 in the Region of Influence. If in a peak-year project-induced demand for these products was \$2,500,000, then an estimate of additional demand in the region would be 5.4 percent of products in SIC category 34. In addition, where data permit, the actual and estimated 1983 peak production levels for some major product categories are indicated.

### 2.1.4.2 Existing Conditions

#### 2.1.4.2.1 Cement

Due to high transportation costs, cement producers ordinarily supply only regional markets. However, the three cement producing firms in the Region of Influence will supply this region from plants as far away as Texas and Oklahoma. Estimated annual cement production as well as peak production capacities are shown below

<u>Cement Producers</u>	<u>1983 Annual Production<sup>1</sup></u>	<u>1983 Peak Capacity</u>
Monolith Portland Cement	265 000 tons	500 000 tons
Ideal Basic Industries <sup>2</sup>	1 075 000 tons	1 280 000 tons
Martin Marietta	425 000 tons	520 000 tons
TOTAL	1 765 000 tons	2 300 000 tons

1 Estimates for those plants capable of supplying Region of Influence only. Includes however potential shipments from a plant in Utah (up to 50 000 tons).

2 Includes a large southern Colorado plant and a Superior Nebraska plant. Peak capacity includes the Fort Collins, Colorado plant currently shut down.

Table 2.1.4-1

**PROJECT MATERIALS BASELINE PURCHASES BY  
STANDARD INDUSTRIAL CLASSIFICATION**

<b>Project</b>	<b>Standard Industrial Classification Code</b>	<b>Estimated Purchases For 16-County ROI (\$1,000s)<sup>a</sup></b>
Fabricated Structural Metal	34	\$ 46,255
Unclassified Professional Services and Products	899	334,908
Cement and Concrete Products	324	63,579
General Wholesale Trade	50	931,670
Structural Metal Products <sup>1</sup>	342	2,876
Plywood and Lumber, Other Wood Products	24	22,407
Copper, Copper Products	335	2,030
Electrical Lighting and Wiring	361	2,180
Stone and Clay Mining and Quarrying	142	14,769
Stone and Clay Products	329	4,181
Basic Steel Products	331	7,620
Heating and Air Conditioning Apparatus	3585	2,025
Plumbing and Plumbing Fixtures	326	2,025
Petroleum Refining and Products	2911	17,129
Material Handling Equipment	35	16,541
Sawmills and Planing Mills	242	6,532
Paints and Allied Products	285	5,240
Plastic Products	282	46,922
Furniture and Fixtures	25	11,169
Structural Clay Products	325	11,084
General Hardware	3429	9,038
Scientific Instruments	381	11,824
Rail Transport	401	336
Real Estate	65	200,347
Construction, Mining, and Oilfield Machinery	353	30,488
<b>TOTAL</b>		<b>\$ 1,803,175</b>

<sup>1</sup> Not included in other Industrial Classifications.

<sup>a</sup> Data from Department of Commerce, Bureau of Economic Analysis, County Business Patterns, 1979 adjusted to 1982.

Note: ROI = Region of Influence.

#### 2.1.4.2.2 Coarse and Fine Aggregate

In the Region of Influence there is a plentiful supply of coarse and fine aggregate, including sand, and it is anticipated that even a short term, large increase in demand will not create supply problems. Discussions with aggregate producers suggest that current output of aggregate is about half of total capacity, reflecting recent inactivity in construction. A sample survey of aggregate producers was conducted to determine plant capacities. The results suggest that producers given sufficient lead time can easily double output. In addition, known estimates of aggregate reserves in the Region of Influence exceed 175 million tons.

#### 2.1.4.2.3 Ballast

There are three major producers of ballast in the Region of Influence. Discussions with several of these producers indicate that even if all project-required ballast was purchased in a 1-month period, supply available is more than adequate.

#### 2.1.4.2.4 Asphalt

In general asphalt markets are contained within a 200 to 400-mile radius of producers plants. In the Region of Influence, there are two asphalt plants that fall in this category. These plants, and their capacities are indicated below. Note that Conoco also has a plant in Billings, Montana. Depending on asphalt demand originating from local road construction a small excess capacity may be available for the project from the Billings refinery.

<u>Asphalt Producers</u>	<u>1983 Average Capacity</u>	<u>Estimated Peak Capacity</u>
Husky Oil Refinery, Cheyenne, WY	800,000 barrels	900,000 barrels
Conoco, Denver, CO	1,200,000 barrels	1,800,000 barrels
TOTAL:	2,000,000 barrels	2,700,000 barrels

#### 2.1.4.2.5 Roofing

In general, the market area for asphalt roofing is within a 300 to 500-mile radius of a producer's plant. Only one plant, meeting that criteria, lies in the Region of Influence. This plant, owned by Georgia-Pacific, produced in 1983 about 125 truck loads of roofing material per week. This output is equal to 2.7 million square feet. Currently excess capacity is available, and by working three shifts, production can be increased to 3.3 million square feet per week.

#### 2.1.4.2.6 Plywood Lumber and Other Wood Products

In general, the market area for lumber, including plywood and milled products, is a national market. In the Region of Influence there are several small sawmills. These mills, however, produce only specialty products for a local market.

#### 2.1.4.2.7 Fuel

Issues related to fuel demands are not included in the construction resources analysis. Refer to Section 2.1.8 for this discussion.

#### **2.1.4.2.8      Concrete Block and Brick**

There are a number of producers of concrete block and brick products within the Region of Influence. Producers within the Region of Influence are located in Scottsbluff, Nebraska, and Cheyenne and Torrington, Wyoming. State directories indicate local and regional market areas for these producers. Production data show that the local industry is capable of producing about 5 million units annually.

#### **2.1.4.2.9      Basic Steel Products**

The market area for structural and reinforcement steel and steel rail is national in scope. There are presently no steel mills in the Region of Influence; however, forming and fabrication capacity for common types of construction steel is in ample supply locally.

#### **2.1.4.2.10     Materials not Elsewhere Discussed**

Additional materials requirements that are project-related are indicated in Table 2.1.4-1. As mentioned in Section 2.1.4.1.2, the dollar amounts are an estimate of product availability. Section 3.1.4 discusses locally relevant project impacts on the market in detail.

## **2.1.5      Social Well-Being**

Social well-being is defined as the subjective assessment of individual or community social indicators, actual and perceived characteristics of behavior, and expectations regarding future social conditions and changes. In this report the focus of the assessment is on the collective issues of social well-being in communities in the study area, as opposed to the social well-being of individual local residents or population subgroups.

This section identifies the demographic characteristics and historical trends relevant to current conditions, describes existing institutional and social structures, and highlights major community values and concerns for communities impacted by the project.

The description of existing conditions provides a framework for evaluating social, economic, and community well-being issues which may adversely impact the communities.

### **2.1.5.1      Region of Influence, Data Sources, and Analytic Methods**

#### **2.1.5.1.1      Region of Influence**

The Region of Influence for social well-being is the same as for housing (Figure 2.1.2-1). This six-county region represents the areas where population immigration is expected to occur, with the exception of Banner County which only experiences relocation effects.

The Area of Concentrated Study for social well-being is considered to be Laramie County, and the city of Cheyenne; and the town of Pine Bluffs, Wyoming; Platte County, and the towns of Wheatland and Chugwater, Wyoming; and Kimball County, and the City of Kimball, Nebraska. These areas were defined as Areas of Concentrated Study because project-related population immigration of over 5 percent during any 1 year is expected to occur in Platte and Kimball counties. Although projected population immigration only approaches, but does not exceed, 5 percent in Laramie County, it was included because it is the physical center of project activity surrounding F.E. Warren Air Force Base (AFB).

#### **2.1.5.1.2      Data Sources and Analytic Methods for Existing Conditions**

##### **2.1.5.1.2.1      Data Sources**

Data sources utilized in describing the existing conditions for the Areas of Concentrated Study in social well-being include statistical data from the 1980 Census of Population, the Nebraska Department of Health, the Wyoming Division of Health and Medical Services, the Nebraska and Wyoming Commissions on Law Enforcement and Criminal Justice, the University of Wyoming Institute for Policy Research, and the University of Nebraska Bureau of Sociological Research. Additionally, area impact committees, relocation specialists, and community officials and representatives were consulted. Recent literature on impact assessment in the West was reviewed including Murdock and Leistritz (1979), Freudenburg (1980, 1982), Flynn and Flynn (1982), Wilkinson et al. (1982), and Branch et al. (1982).

##### **2.1.5.1.2.2      Analytic Methods for Existing Conditions**

Methods utilized in the analysis of existing conditions for social well-being include identification and evaluation of well-being statistical indicators, and information on well-being issues obtained from community residents, officials and study groups formed for the project.



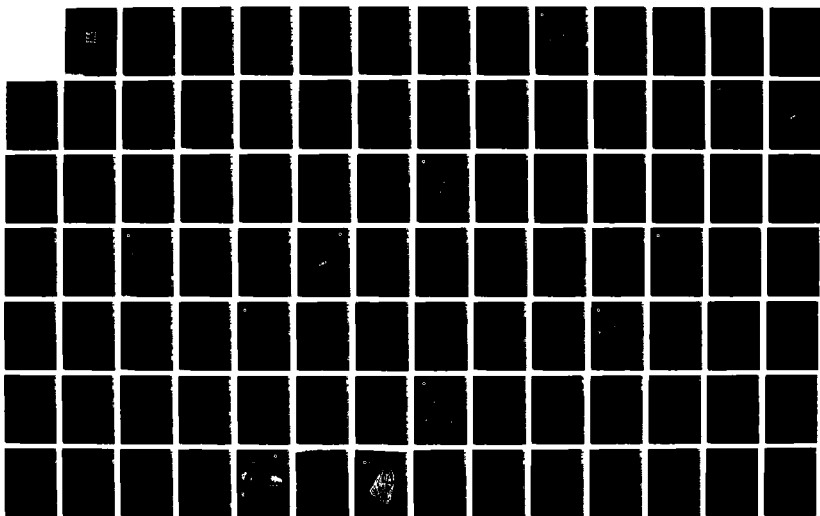
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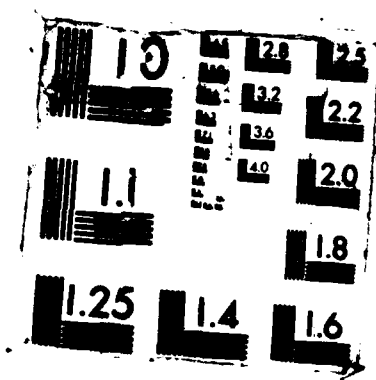
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### **2.1.5.2     Existing Conditions**

Relevant data on existing conditions of social well-being are described first for Laramie County, including the City of Cheyenne, and the town of Pine Bluffs, followed by Platte County and the towns of Wheatland and Chugwater, then for Kimball County and the City of Kimball.

#### **2.1.5.2.1     Laramie County, the City of Cheyenne, and the Town of Pine Bluffs**

Laramie County, established in 1867, is located on a high plateau with hilly, mountainous terrain in the north and west. Much of the land is suitable for livestock raising and dryland farming, which in combination with railroad activities, dominated the early development and culture of the region.

Cheyenne is the government seat for Laramie County, the state capital and the second largest city in Wyoming. In the late 1800s, it prospered from cattle raising. Additionally, the 1867 establishment of the Union Pacific Railroad's mountain headquarters in Cheyenne, economically secured the city's future growth and stability.

The Town of Pine Bluffs, located about 45 miles east of Cheyenne, served as an important cattle loading station during the cattle industry's early period of prosperity, and was incorporated in 1909.

Because it functioned as a major transportation center, Cheyenne proved less vulnerable to two historically critical elements in the prosperity and decline cycles of the economy in other areas of the state: temperature and precipitation. Although severe temperatures and drought episodes have profoundly affected Cheyenne in the past, railroad-related activities have bolstered the economy sufficiently to maintain the economic stability of the community.

In 1867, the U.S. Army established Fort D.A. Russell, outside of Cheyenne, ultimately one of the largest U.S. Cavalry posts. By presidential proclamation, the fort's name was changed to Fort Francis E. Warren (honoring Wyoming's first governor) in 1930, then was transferred to the Air Force in 1947. Today, F.E. Warren Air Force Base (AFB) is one of the area's largest employers. Of the total number of military personnel assigned to F.E. Warren AFB in 1982, 70 percent lived offbase in the local Community, and 60 percent of personnel brought families with them. In 1982, military personnel represented approximately 18 percent of the Cheyenne population.

The first missile squadron involving deployment of Atlas missiles was established at F.E. Warren AFB in 1960. Between 1963 and 1965, the Atlas missiles were phased out and replaced by Minuteman I missiles, and later by Minuteman IIIs between 1972 and 1975. In summary, the region surrounding F.E. Warren AFB has housed ICBMs for many years, and has experienced modernization of missile systems twice in the recent past.

While the county has enjoyed periods of robust economic growth, it has also experienced periods of decline. Current per capita income of \$12,200 (in 1982 dollars) was higher than both the state and national figures, while the county's 5.2 percent unemployment rate in 1982 was lower. The 1980 census figures show that approximately 8 percent of both Wyoming and Laramie County residents were living below the poverty level in 1979, and 1 percent of these residents were 65 years of age or older. In the same year, Laramie County had 6.7 percent of its families living below the poverty level; and 40.2 percent of these families were headed by single females. These rates are considerably higher than the state's, but lower than the nation's.

The 1980 population of 68,649 was approximately 92 percent white, and 3 percent black, with 10 percent of its residents of Hispanic descent. The median age of residents, in 1980, was 28.1 years. At the same time Laramie County was 85 percent urban with slightly more males than females.

In 1980, the population density of Laramie County was 25.6 persons per square mile, compared to a national average of 64.0 persons and a statewide average of 4.8 persons.

Cheyenne's 1980 population of 47,283 comprised nearly 70 percent of Laramie County's population and, except for a slightly higher percentage of persons of Spanish descent, the ethnic distribution was nearly the same as the county's. In the town of Pine Bluffs, the 1980 population of 1,077 was over 96 percent white, with nearly 7 percent persons of Hispanic descent. The median age of resident, 35.8 years in 1980, was considerably higher than the County's median age of 28.1 years.

In 1981, marriage and divorce rates for Laramie County and the State of Wyoming were considerably higher than the national rates and, although no firm conclusions can be drawn, higher marriage and divorce rates could potentially indicate higher levels of family instability in both the county and state. Additionally, the 1981 birth-to-population rate for unwed mothers of 238.3 per 100,000 for Laramie County was among the highest in the state.

Alcoholism rates for Wyoming are among the highest in the nation and criminal arrests for alcohol-related offenses and disorderly conduct are also disproportionately higher. In 1981, arrests for driving while intoxicated comprised 16 percent of all county arrests, and arrests for disorderly conduct comprised nearly 21 percent of arrests. Overall crime rates, however, were lower than state and national rates.

The numbers of transients in the Cheyenne community has also been increasing in recent years. Although the number is not presently high relative to the total population (approximately 200 at any given time), local residents feel their sense of community well-being has decreased with the increase in transients.

Accompanying social changes in the county are changes in community lifestyles and a blending of old and new lifestyles. The old western flavor of Cheyenne is preserved and revitalized each year for ten days, in July, during Frontier Days. Rodeos, night arena shows, parades, chuckwagon breakfasts, exhibits, Indian dances, and country entertainment draw an estimated 300,000 to 325,000 visitors to Cheyenne for this event.

Cheyenne has good facilities and services relative to most other communities in the state. In Cheyenne there are a large number of churches of various denominations, schools, hospitals and clinics, human services programs (as inventoried in the public services and facilities section), day nurseries/child care facilities, indoor and outdoor recreational facilities, and two public libraries. Numerous business and professional organizations, social and fraternal clubs, special interest clubs, and youth organizations also foster community involvement and integration.

In addition to the County facilities shared by residents of Pine Bluffs, the town has its own community facilities to promote social well-being. These include the churches, schools, organizations, and clubs; plus its own library community center, outdoor recreational area, various parks and fairgrounds.

Positive features of community life in the county according to residents include educational opportunities, a spirit of volunteerism, good medical care, an ability to influence decisions, a lack of elitism, the natural environment, the small community atmosphere, and the low cost of

living. Concerns which were noted include: limited cultural and ethnic diversity; increased substance abuse; community resistance to change; the need for a greater sense of community direction, stronger leadership, and more support for social services; stronger emphasis on the quality of land use development; and improvement of the downtown image.

The level of economic diversity and complexity in the City of Cheyenne is high compared to most other communities in the state due to the presence of the state government, the military, the railroads, and agricultural activity. Because Cheyenne is the home of many government agencies (including the military), the community has extensive contacts with other local communities and with regional, national, and international associations. These linkages have expanded considerably during the past decade of energy development.

As previously indicated, Cheyenne has had experience with the growth and decline of agriculture, railroads, and military installations. Additionally, many State of Wyoming employees who reside in Cheyenne have been involved with energy development growth problems in other communities in the state. Many of the local officials, however, have not had experience with managing growth from large industrial projects but, due to the city's past history of military and industrial development, new development is not considered threatening.

The distribution of power and resources in Cheyenne is relatively open and equitable because of the presence of competing economic activities. Although there do not appear to be any extreme differences in access to resources, there is inadequate access to resources among some elderly and fixed income residents. Cooperation and coordination appears to have been reasonably effective in the Cheyenne community in recent years and coordination within city and county agencies appears to have been moderate to good.

The town of Pine Bluffs has not experienced the same degree of community diversity as Cheyenne, nor is the access to power and resources as open. Although the town is relatively large, its social opportunities are more limited and its lifestyle is more rural than Cheyenne's. Close proximity to Cheyenne, is an advantage because residents of Pine Bluffs are less than an hour's drive from typical urban services which are not available in their own community.

#### **2.1.5.2.2      Platte County and the Towns of Wheatland and Chugwater**

In 1911, Platte County was formed from the northwestern portion of Laramie County by the Wyoming State Legislative Assembly. The history of settlement in the area began in the early 1800s. During this period the Platte County area was sparsely settled by traders engaged in providing supplies to pioneers passing through the area on their way west. The commercial cattle industry flourished in Platte County until the late 1800s when dryland and irrigated farming became more prominent in the area.

Concentration of the county's economy in the agricultural sector continued into the 1900s, following national agricultural trends. This area, like other agricultural communities, declined during the Depression of the 1930s, and during the period from 1940 to 1960, the number of farms and ranches in the county was further reduced by trends towards larger agricultural operations and mechanization.

In 1976 construction began on the Missouri Basin Power Plant, a 1500 megawatt coal-fired electric generating power plant. Construction employment at the power plant reached a peak of over 2,300 in 1979, but the size of the operating work force size has stabilized at about 300 employees since completion of construction in 1983.

Wheatland, the largest town in Platte County, was founded in the late 1800s, incorporated in 1905, and became the county seat in 1911 when the county was formed. The town received its name from the Wheatland Colony, a name given to the irrigated farms established by the Wyoming Development Company between 1883 and 1893.

The economy of the town of Chugwater was initially fueled by cattle ranching prior to the development of the major irrigation projects in the area, and until 1947, it was the home office of the Swan Land and Cattle Company.

In 1982 Platte County's unemployment rate of 7.1 percent was higher than the state's, but lower than the nation's, while personal per capita income of \$7,800 in 1982 was considerably lower than both the state and national figures. The county also had a larger percentage of the 1980 population living below the poverty level than the state, including a slightly higher percentage of persons 65 years of age or older.

The population of Platte County decreased between 1920 and 1970, increased during the 1970s as a result of power plant immigration, then declined again to 11,975 in 1980. The median age of resident, 28.5 years, was higher than that of the state in 1980, but lower than that of the nation. The population consisted of 52 percent males, 98 percent whites, and 5 percent persons of Hispanic descent. Wheatland had a 1980 population of 5,816 (48.6 percent of the county population) and an ethnic composition similar to the county, while Chugwater had 282 residents, 98 percent of them white.

Platte County was 51.4 percent rural in 1981, with a population density of 5.9 persons per square mile. The county's communities are relatively small and predominantly farming and ranching oriented, with a rural life style and limited number of recreational and social opportunities. While marriage rates in 1981 were lower than the state and higher than the nation, divorce rates for both the County and state were considerably higher than national rates.

In 1981, crime rates in the county were lower than the state and the nation; however, alcohol-related arrests nearly doubled those of Laramie County and the state (30.5 percent of all arrests were for driving while intoxicated).

The county's community, human services, and social facilities include the churches and schools, a hospital, a mental health center, a library, and a limited number of day nursery and child care facilities. Other organizations to promote social well-being include fraternal, service, social, special interest, and youth associations. A limited number of recreational facilities are also available in the county.

Platte County residents highly value their outdoor recreational facilities, open space, and rural life style. Discussions point to a perceived ideological split between urban and rural residents over the issues and problems surrounding growth. Some residents are optimistic about future growth, while others feel growth is incompatible with the more traditional life style they value.

Much of the population growth experienced in Platte County as a result of power plant development was temporary, and changes in diversity and complexity did not occur to the extent that might be expected in other development situations. Local political entities expanded less than they would subsequently have to contract. The social differentiation that did occur in Wheatland, during the 1970s, has been welcomed and various groups are likely to be supportive of future development.

Expansion in the distribution of resources and power at the county level seem inevitable especially if the size of Wheatland's population stabilizes at approximately half of the county population. In Wheatland, the group of people in professional occupations has increased in size and become more influential as the permanent work force at the power plant has settled into the community.

Wheatland appears to have a well developed sense of community coordination and cooperation. The county largely represents rural and agricultural interests in the area, and the town represents a more urban and industrial perspective.

#### 2.1.5.2.3 Kimball County and the City of Kimball

Kimball County was established in the southwestern portion of Nebraska along the South Platte River in 1888. The county owes its existence to the Union Pacific Railroad and was named after its vice president at that time.

Although the early economy of the area was dominated by ranching and farming, Kimball County and the City of Kimball have experienced both missile, and oil and gas development. In the 1950s, Kimball County experienced two economic booms, with the main impact occurring around the City of Kimball. In June, 1951, oil was discovered and Kimball became the service and supply center for oil producers in the Denver-Julesburg Basin, serving northeastern Colorado, southeast Wyoming, and the Nebraska Panhandle.

In 1954, the United States government began installation of 200 ICBMs around Kimball. At first there was a large influx of military personnel, but after installation was completed, personnel was reduced until only a few maintenance crews remained. The community of Kimball has been known locally as "Missile Center USA" and the "Oil Capital of Nebraska."

The county's major employment categories from the 1970s forward have been government, trade, small business, and agriculture. Agriculture is traditionally and currently a major source of employment. The government employment category includes jobs connected with the missile sites.

The county's unemployment rate in 1982 was 5.0 percent (lower than the state and national rates) and personal per capita income, in 1982 dollars, is currently about \$13,000 (higher than both the state and the national averages). In 1979, a higher percent of Kimball County's population was below the poverty level (12.6 percent) than that of the state and nation, and persons over 65 years of age accounted for 1.4 percent of these persons. In 1979, the percent of families below the poverty level in Kimball County was 10.7 percent (higher than both the state and the national rates), and 14.6 percent of these families were headed by single females.

The population in Kimball County has fluctuated over time with a peak in 1960 and steady declines since then. The county's 1980 census population was approximately 64 percent urban, 98 percent white, and 3 percent persons of Hispanic descent. The 1980 median age of residents was 32.2, the same as the the state, with males and females in the county nearly evenly represented.

Residents in Kimball, the main city and county seat of Kimball County, comprised nearly 64 percent of the county population in 1980, and the 3,120 total residents had only a slightly different ethnic composition than the county.

The percentage of urban residents in both Kimball County and the State of Nebraska is similar to that of the nation. The State of Nebraska was 62.9 percent urban, Kimball County was 63.9 percent urban, and the nation had an urban population of 61.4 percent. However,

population density for the county, state, and nation were considerably different. While the national population density was 64 persons per square mile, Nebraska had a density of 20.5 persons, and Kimball County had 5.1 persons per square mile. Like residents in Platte County, Kimball County's residents identify with an agriculturally oriented life style.

Currently, Kimball County crime rates are considerably lower than both the state and the nation. Arrests for driving while intoxicated were fairly high in 1981, however, comprising 16.9 percent to total arrests. Residents are concerned about alcohol abuse and a program has recently been established to assist residents with alcohol-related problems. In discussions, Kimball residents expressed concern over past increases in transients, and transient-related problems.

Facilities and organizations important to social well-being in the area include: churches of various denominations; schools; a county hospital; a library; and over a dozen professional and business, service, social, and youth organizations. These, together with a limited number of recreational facilities, provide some opportunities for social integration.

Kimball area residents characterize their community as one with an active spirit of support for their neighbors and community through volunteerism. They are proud of recreational opportunities in and around the community, and are generally satisfied with local services and the performance of city government. Most residents look forward to economic growth to offset recent increases in population outmigration and unemployment.

Discussions with community residents indicate little diversity or complexity in the community and no major sources of social conflict. Due to growth and decline cycles, however, the county and city have had to respond to fluctuating demands for services, facilities and other resources. Consequently, the organizational characteristics of the community reflect these trends. The currently small population dictates a rural service and resource network with some excess in facility capacities.

Ties to outside communities were stronger during earlier oil and gas booms, and missile developments. Kimball County is primarily dependent upon Scotts Bluff County for many human services.

Assuming the distribution of wealth and income is positively associated with political power, some shifting of power could have recently occurred due to an influx of professionals with relatively high incomes. County residents have a relatively high per capita income, yet a greater number of residents are living below poverty than for the state as a whole. The declining and aging population also points to a situation where more old-time residents control activities. Coordination and cooperation in the community appears to be high and residents have indicated satisfaction with their services and life styles.



## **2.1.6      Public Services and Facilities**

The public services and facilities resource consists of eight primary responsibilities of the public sector that provide for the health, safety, and welfare of the general public. Within each of the following eight elements of public services and facilities, the supply (institutional) and demand (clientele) sides of the elements are addressed. Facilities, staffing, organization, and, where appropriate, capital equipment are discussed. The eight elements are:

- o Education (public and private elementary, junior high schools, senior high schools, special education, gifted programs, and post-secondary education);
- o Law enforcement (county sheriff and municipal police departments);
- o Justice system (municipal, county level, and district courts; public defender and district or county attorney's offices);
- o Fire protection (municipal fire departments and rural fire districts);
- o Health care (local and military hospitals, public and private health services, special health services, and emergency medical services systems);
- o Human services (state and local social service agencies and quasi-public providers);
- o General government (county and municipal administration and maintenance); and
- o Libraries (state, municipal, county, college, and military).

The information in this section is based upon data and detailed analysis contained in the Public Services and Facilities Environmental Planning Technical Report.

### **2.1.6.1      Region of Influence, Data Sources, and Analytic Methods**

#### **2.1.6.1.1      Region of Influence**

The public services and facilities Region of Influence is restricted to an area of potential measurable impacts. This includes any governmental jurisdictions that would receive direct population immigration resulting from the project or that are in the Deployment Area. As can be seen in Figure 2.1.6-1, the Region of Influence includes the counties of Laramie, Platte, and Goshen, Wyoming; and Kimball, Banner, and Scotts Bluff, Nebraska.

Definition of the Region of Influence is based upon anticipated level of impact. Since local jurisdictions provide public services, increased population is the single most important determinant of effects on service provision.

Within the Region of Influence, an Area of Concentrated Study has been determined by identifying communities with potentially significant population impacts. This includes Laramie County, the city of Cheyenne, the town of Pine Bluffs, Platte County, the town of Wheatland, and the town of Chugwater, Wyoming; and Kimball County and the city of Kimball, Nebraska. See Section 3.1.6.1 for a more detailed justification of the Area of Concentrated Study.

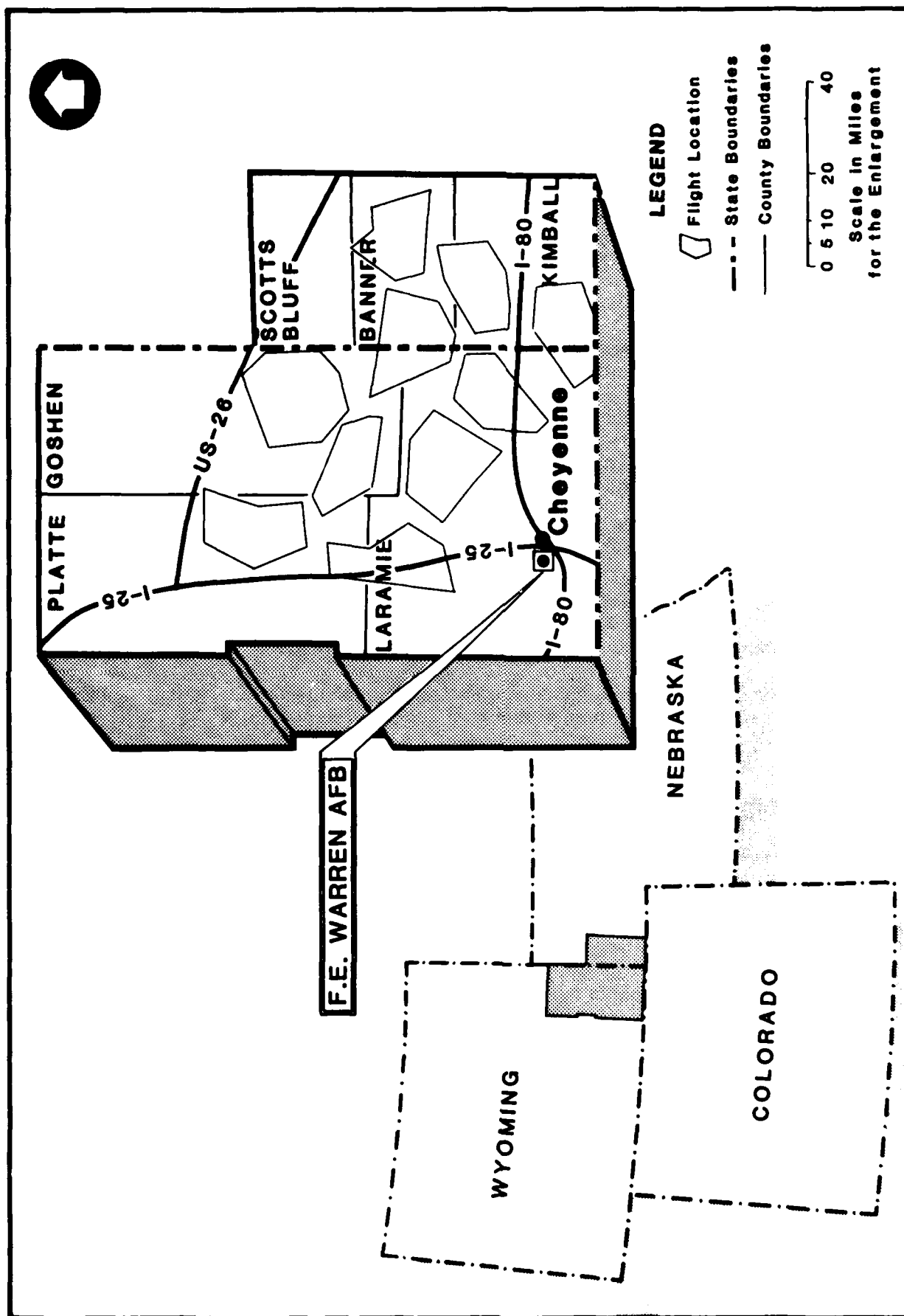


FIGURE 2.1.6-1 REGION OF INFLUENCE FOR PUBLIC SERVICES

#### **2.1.6.1.2      Data Sources and Analytic Methods for Existing Conditions**

##### **2.1.6.1.2.1      Data Sources**

Both primary and secondary data sources were utilized in this analysis. Primary data sources included extensive interviews with local officials in the Area of Concentrated Study. In addition, a condition and capacity analysis was performed on selected facilities in the study area. Secondary data included annual reports of the various agencies and departments, local government budgets, state government publications on local service providers, professional papers and reports on applicable local and state service levels, and census materials.

##### **2.1.6.1.2.2      Analytic Methods for Existing Conditions**

The methodology employed for existing conditions consisted primarily of an inventory assessment. Both primary and secondary data sources were utilized. Methods included a case study approach utilizing personal interviews with local officials, review of existing budgets, annual agency reports, comprehensive plans, and other applicable local and state data publications. Existing conditions were primarily determined through interviews with local representatives.

After information on existing conditions was collected, it was organized and refined to permit an analysis of the adequacy of existing services and facilities to meet the needs of the current populations within their respective governmental jurisdictions. Except where absolute standards were available, this analysis was based primarily on current local service delivery standards, and the historical conditions which have led to these service levels.

#### **2.1.6.2      Existing Conditions**

##### **2.1.6.2.1      Education**

##### **2.1.6.2.1.1      Laramie County**

Laramie County School District No. 1. Laramie County is divided into two public school districts, No. 1 in western Laramie County including Cheyenne, and No. 2 in eastern Laramie County. District No. 1 contains 25 elementary, 3 junior high, and 2 high schools, plus the alternative high school. School District No. 1 is divided into four groups of schools called clusters. Students are bused, if necessary, to schools within a specific cluster. Total enrollments decreased from 1974 to 1981 along with declines in the student-to-teacher ratio. Total enrollments increased slightly in 1982 with 12,888 students, while certified staff numbered 897, and noncertified support staff totaled 528 persons. Since the District makes every attempt to enroll students with special needs in regular classrooms, those special education students assigned full time to special classrooms have declined from 347 in 1976 to 95 in 1982.

There presently is excess capacity in nonpublic schools in Cheyenne. The State of Wyoming has no control over these schools; centralized records are not maintained on staff, enrollments, and curricula. The following are the major nonpublic schools in Cheyenne: Cheyenne Christian School, Our Savior Lutheran Elementary, Redeemer Lutheran School, St. Mary's Elementary, Seton Catholic High School, Seventh-Day Adventist Elementary, and Trinity Lutheran School. Total enrollment in these schools in 1982 was approximately 695.

A facilities study of public elementary schools in District No. 1 indicates that there is a need to upgrade space for regular and special instruction and support areas. Overall, elementary, junior high, and high schools in the District are operating at or near capacity. In the elementary

schools capacity is approximately 6,600 students. Total fall 1982 enrollment was 6,900 students. Total secondary school capacity is 5,873 students with a fall 1982 enrollment of 5,863.

Laramie County School District No. 2. Laramie County School District No. 2 is located in eastern Laramie County and includes Albin, Burns, Carpenter, Hillsdale, and Pine Bluffs. There are four public elementary schools, three public junior high schools, and three public high schools in the District. Overall, enrollments have steadily decreased in the last 10 years with a corresponding decrease in pupil-to-teacher ratios. There is excess capacity available in the District's schools with the exception of Pine Bluffs Elementary and Burns High School. There are no official plans for expansion of the facility although local School District officials anticipate that this could occur in the next few years.

Post-secondary education in Laramie County (not a School District responsibility) is offered at Laramie County Community College, the Cheyenne Field Office of the University of Wyoming, evening courses at Carey Junior High School, and through the Education Office at F.E. Warren AFB.

#### 2.1.6.2.1.2 Platte County

Two school districts are located in Platte County. School District No. 1 is the largest, encompassing all but the northeastern corner of the county. There are nine schools included in the District.

The construction of the Laramie River Power Station affected student enrollment in the late 1970s when it peaked at 2,183 (1979). The enrollment in 1982 was down to 1,644; prior to 1973 there was a steady enrollment of around 1,250 students. The associated pupil-to-teacher ratio also followed the decreases and increases in enrollments. Because Platte County School District No. 1 was able to accommodate the impact enrollments of the Laramie River Power Station, there is currently excess capacity in the buildings.

There are no post-secondary schools in Platte County, but adult education is offered in Wheatland through Wheatland High School.

#### 2.1.6.2.1.3 Kimball County

The four school districts in the Kimball County system are Kimball County High School (9-12), Kimball Public School (K-8), Dix Public School (K-12), and Bushnell Elementary (K-8). Enrollment records for Kimball County indicate that total system enrollments during 1973 to 1982 decreased by 39 percent while pupil-to-teacher ratios remained steady. As such, considerable excess facility capacity presently exists.

There are no post-secondary schools in Kimball County, but adult education is offered in the city of Kimball at the high school.

#### 2.1.6.2.2 Law Enforcement

##### 2.1.6.2.2.1 Laramie County

The Laramie County Sheriff's Department has 62 officers, including 29 patrol deputies and 6 jailers. Civilian support staff numbers 22, including dispatchers, clerks, and others for a total Department staff of 84. Department vehicles include 15 marked patrol cars and 19 other vehicles.

The Sheriff's Department and County Jail are located in Cheyenne in the City/County Building. Administrative and office space is 2,071 square feet (sq ft), or 25 sq ft per employee, indicating overutilization and a significant space shortage. The jail, built in 1911, contains 3,371 sq ft and has a nominal capacity of 56, plus 8 more in trusty quarters. Average daily occupancy is 33; however, capacity is often approached. In addition, the jail is inadequate by fire code and other County building standards, and needs to be modernized or replaced.

While reported crime has fluctuated in the county over the last 5 years, data for the first half of 1983 indicate an increase in larcenies while the number of rapes, robberies, aggravated assaults, and vehicle thefts decreased.

#### 2.1.6.2.2.2 City of Cheyenne

The Cheyenne Police Department has 85 officers including 64 on patrol duty. In addition, 25 civilians are employed by the Department as support personnel. The Department has 19 marked cars, 16 other cars, and 6 motorcycles. Although the Department has requested enough marked cars to operate a one patrol officer per car system, this program has not yet been implemented. The Department is located in the basement and first floor of a 2-story building in central Cheyenne and fully utilizes the available 12,912 sq ft. The second level is 6,700 sq ft and is devoted to the 69-prisoner jail, which averages 19 inmates per day.

The total number of Part I crimes (major crimes such as homicide, burglary, etc.) fluctuated within a fairly narrow range between 1978 and 1982. There has been a general increase in larcenies while aggravated assaults, robberies, and vehicle thefts have decreased. Data from the first half of 1983 indicate that this trend is continuing.

#### 2.1.6.2.2.3 Town of Pine Bluffs

The Pine Bluffs Police Department has three sworn officers, plus three fulltime and two part-time civilian support staff. Each of the three sworn officers has been assigned a marked patrol vehicle. The Department is located in a single room of the Town Hall and contains approximately 180 sq ft. Adjoining this room is a two-cell jail with an additional cell located on the second floor.

#### 2.1.6.2.2.4 Platte County

Law enforcement in Platte County is provided by the Sheriff's Department located in the basement of the courthouse in Wheatland. The Department has seven sworn personnel each with a marked vehicle. There are nine civilian staff including two jailers. The offices of the Sheriff's Department contain approximately 1,080 sq ft. The jail, containing prisoners from other Platte County communities as well as from the county itself, has six two-man cells, plus space for seven other prisoners in a larger cell.

#### 2.1.6.2.2.5 Town of Wheatland

The Wheatland Police Department has ten sworn personnel; nine are on patrol duty and one is a detective. There are three civilian support personnel, two of whom are on animal control duties. The Department occupies 783 sq ft in a building adjacent to the Fire Department. All city prisoners are taken to the County Jail. Vehicles include three marked patrol cars and two unmarked cars. Since the completion of the Laramie River Power Station, crime in Wheatland has been decreasing as workers from that project have moved out of town.

#### 2.1.6.2.2.6 Town of Chugwater

The Town of Chugwater has one part-time Town Marshall who patrols the town. Other law enforcement agencies active in the Chugwater area include the Wyoming State Patrol, especially on Interstate 25 adjacent to the town, and the Platte County Sheriff's Department. The Town Marshall has no office or jail space.

#### 2.1.6.2.2.7 Kimball County

The Kimball County Sheriff's Department includes the Sheriff, one deputy, four reserve deputies, and four civilian staff. There are two marked patrol cars in service. The Department's offices contain 960 sq ft; there is also a 9-prisoner jail which averages 3 occupants per day including city of Kimball prisoners.

#### 2.1.6.2.2.8 City of Kimball

The City of Kimball Police Department has six officers and two civilians. There are two marked patrol cars and one unmarked unit. The Department's offices are located in City Hall and consist of 960 sq ft. There is no city jail as all prisoners are taken to County Jail.

### 2.1.6.2.3 Justice System

#### 2.1.6.2.3.1 Laramie County

Laramie County Court has criminal jurisdiction for all misdemeanors committed in the county (except for municipal ordinance violations) and includes all offenses not punishable by death or imprisonment in the state penitentiary. The County Court's annual criminal caseload is about 10,275; over 90 percent are traffic violations. The majority of dispositions are by forfeiture and guilty plea. Criminal docket support staffing consists of two full-time judges and 4.5 full-time equivalent support personnel. The Court also handles roughly 4,000 civil cases per year. Civil docket support staff number 4.0 full-time equivalents. Space for the Court is located in the County Courthouse; courtrooms are shared with the District Court which handles all felony cases. Office and workspace are limited; total space available solely to the County Court is 1,233 sq ft.

#### 2.1.6.2.3.2 City of Cheyenne

The Cheyenne Municipal Court has exclusive jurisdiction over municipal ordinance violations such as traffic citations, animal control violations, and others. The Court's annual caseload is 12,565, of which a majority are traffic violations. Only 9.5 percent of total cases are tried. The Court staff consists of one full-time attorney judge, one part-time attorney judge, one court clerk and commissioner, one liaison city police officer, and three clerk typists. There is sufficient space in the Municipal Building to accommodate Court functions; however, the Court is now functioning at operational capacity.

#### 2.1.6.2.3.3 Town of Pine Bluffs

The Pine Bluffs Municipal Court handles approximately 120 cases per year. The Court's staff is a part-time lay judge, and the Town Council chambers are used for a courtroom. The Court is presently functioning within its operational capacity.

#### 2.1.6.2.3.4 Platte County

The Platte County Justice Court has jurisdiction over all misdemeanors committed within the county (except for municipal ordinance violations). The Court's annual caseload is approximately 5,520 and the majority of dispositions are by forfeiture, failure to appear, and guilty plea. The Court's staff consists of a full-time lay judge, a clerk of the court, and a part-time deputy clerk.

#### 2.1.6.2.3.5 Town of Wheatland

The Wheatland Municipal Court has jurisdiction over municipal ordinance violations. The Court's annual caseload is approximately 950, and 90 percent of all dispositions are pretrial. Court staff consists of a full-time lay judge and a clerk of court. The Court is currently functioning within its operational capacity.

#### 2.1.6.2.3.6 Town of Chugwater

The Chugwater Municipal Court has jurisdiction over municipal ordinance violations. The Court handles less than 25 minor traffic offenses per year and is staffed by a part-time lay judge. The Court is currently functioning within its operational capacity.

#### 2.1.6.2.3.7 Kimball County

In Kimball County, County Court has jurisdiction over violations of City of Kimball ordinances, misdemeanors, juvenile matters, and preliminary hearings. The only other court, County District Court, has jurisdiction over all felony cases and appeals from County Court. County Court handles about 1,000 cases per year with little or no backlog. Staffing includes the court clerk (who also serves as an associate county judge and is paid by the State), a deputy clerk, and two clerical workers. County Court is located in the Kimball County Courthouse and space is considered adequate.

#### 2.1.6.2.4 Fire Protection

##### 2.1.6.2.4.1 Laramie County

Laramie County Fire District No. 1. Fire protection for rural Laramie County is provided by seven fire districts, of which only three, Districts No. 1, 2, and 5, would receive sufficient immigration to warrant attention. There are mutual aid agreements between each of the rural fire districts in the Region of Influence and F.E. Warren AFB Fire Department regarding fires at military sites in the respective districts; however, they are not effectively utilized. A second matter germane to area rural fire districts in general is the question of responding to calls in adjacent states. Many of the rural fire districts in the Region of Influence, because of their proximity to state boundaries, have historically responded to calls from nearby areas of adjacent states when requested. Questions concerning the availability of workmen's compensation to volunteer firefighters who are injured on out-of-state calls make the continuation of this traditional practice difficult. District No. 1 serves a 200-square mile (sq mi) area from the Cheyenne city limits south of the Union Pacific Railroad tracks to the Colorado state line. The District has 14 volunteer firefighters and 1 paid employee, a mechanic. The District's one fire station was built in 1967, and contains approximately 3,600 sq ft. Major equipment includes 2 pumpers that pump 750 gallons per minute, 3 tankers, a pickup truck, a van, and the chief's car. On a scale of one to ten (with one being the highest level of protection), the present (1983) fire insurance rating is nine. Existing service levels are 2 volunteers per 1,000 population, 1 firefighting vehicle per 1,000 population, and 500 sq ft per vehicle.

Laramie County Fire District No. 2. Laramie County Fire District No. 2 is located directly north of Cheyenne and serves 164 sq mi with 21 volunteers, a total expected to grow to 27 during 1984. The District has 2 fire stations, 1 built in the late 1950s containing 2,160 sq ft and a second, constructed in 1972, containing 3,600 sq ft. Equipment consists of 3 pumper tankers that pump from 250 to 750 gallons per minute, 1 "quick-attack" truck, 2 four-wheel drive vehicles, and a chief's car. Staffing, equipment, and facilities are considered adequate to meet present needs. The current fire insurance rating for the District is nine.

Laramie County Fire District No. 5 and the Town of Pine Bluffs. Laramie County Fire District No. 5 is headquartered in Pine Bluffs. The Town of Pine Bluffs has its own fire department and shares 13 volunteers with the District. While the two fire departments share volunteers, they have separate fire stations and firefighting vehicles. The District's station houses a pumper tanker, a tanker, and a "quick-attack" unit with a new tanker expected to be delivered in January 1984. The District includes an area of about 213 sq mi west, north, and south of Pine Bluffs.

The Town Fire Station contains about 600 sq ft and houses 2 pumper tankers. The two fire departments jointly own an ambulance. A van used as a personnel carrier can be used as a backup ambulance if necessary.

The volunteers respond to approximately 5 fires per year in the town and between 15 and 25 fires a year in the rural district. The rural district has a fire insurance rating of ten while the town is rated seven.

F.E. Warren AFB Fire Department. The F.E. Warren AFB Fire Department has 39 operational, 6 administrative, and 5 fire prevention personnel. These numbers, which have recently been increased, meet Air Force Manpower Standards for F.E. Warren AFB under 1983 conditions. Firefighting equipment includes four pumpers and one tanker. These vehicles are located in 2 fire stations, one with 10,385 sq ft and the other with 6,573 sq ft.

#### 2.1.6.2.4.2 City of Cheyenne

Fire protection services in Cheyenne are provided by the Cheyenne Fire Department. Staffing consists of 89 firefighters, the chief, a secretary, a training officer, and 6 others distributed among 6 fire stations. Major firefighting equipment totals 10 units that consist of 8 pumpers that pump between 1,000 to 1,250 gallons per minute, an aerial unit and ladder truck, assisted by a utility vehicle, the chief's car, a pickup truck, and 8 cars. Response time is from 3 to 4 minutes, and the present fire insurance rating is 5. Space in 1983 totals 32,948 sq ft. Existing service levels are 1.87 firefighters per 1,000 population, 0.25 firefighting vehicle per 1,000 population, and 678 sq ft of station space per 1,000 population.

#### 2.1.6.2.4.3 Platte County

There are two fire districts and four fire departments in Platte County. The communities of Wheatland, Glendo, Guernsey, and Chugwater have fire departments. Rural Fire District 1F includes an area of about 121 miles around Wheatland outside the city and District No. 1 takes in the remainder of Platte County.

The Wheatland Fire Department is manned by the same volunteers as Fire District 1F. There are presently 37 volunteers. All equipment is garaged at the fire station in Wheatland. That equipment consists of eight pumpers, one tanker, one "quick-attack" unit, one rescue vehicle, and two station wagons. Each of these vehicles is owned either by the Town of Wheatland, District 1F, or by the fire department volunteers as a group. The Town of Wheatland has a fire insurance rating of seven while the area served by District 1F is rated nine.



Fire Zone No. 3 of Platte County Fire District No. 1 and the Town of Chugwater share volunteers and equipment. Fourteen volunteers serve the two organizations. Equipment includes a pumper tanker, tanker, "quick-attack" unit, an ambulance owned by the Town Department, and two pumper tankers and "quick-attack" unit owned by the Fire District. The District has a fire insurance rating of nine.

#### 2.1.6.2.4.4 Kimball County

Fire protection in Kimball County, including the city of Kimball, is provided by the Kimball Fire Department, the Kimball Rural Fire District, the Dix Volunteer Fire Department, and the Bushnell Volunteer Fire Department. Kimball Rural Fire District is a cooperative effort of 39 volunteer firefighters operating out of the 3,500 sq ft fire station in the city of Kimball. While both units utilize the same staff, space, and equipment, the equipment is owned separately. Total equipment consists of 4 pumpers that pump from 500 to 1,000 gallons per minute, 1 tanker, 1 "quick-attack" unit, and 1 ambulance/rescue vehicle which serves as a backup to the county private ambulance service. Kimball has a fire insurance rating of six while the rural area is rated eight.

#### 2.1.6.2.5 Health Care

##### 2.1.6.2.5.1 Laramie County

Laramie County is served by four hospitals, two civilian and two federal, all located in Cheyenne. Laramie County Memorial has 179 licensed beds and currently averages a typical occupancy of 60 to 65 percent although during peak demand operates at 100-percent capacity. There are 91 physicians with staff privileges at County Memorial Hospital, approximately 114 registered nurses (RNs), and 108 nursing support personnel including licensed practical nurses (LPNs), aides, and clerks. Available services include a 24-hour physician-staffed emergency room, pharmacy, X-ray, radioisotope, surgery, social work, obstetrics, electroencephalogram, therapies (chemical, radium, cobalt, X-ray, and inhalation), CT scan, and psychiatric inpatient. Cardiac rehabilitation services are presently being expanded.

DePaul Hospital (civilian), a private facility constructed in 1952, is funded entirely from patient fees. There are 121 licensed beds and average occupancy is about two-thirds of capacity. There are 80 physicians with staff privileges, 83 RNs, 31 LPNs, 31 nurses aides, 3 pharmacists, 2 dieticians, 3 physical therapists, and 18 specialized technicians. The physician staff levels of DePaul and Laramie County Memorial are adequate for providing health services to Laramie County. DePaul Hospital offers a wide variety of services including among others, a 24-hour physician-staffed emergency room, X-ray, pharmacy, laboratory, surgery, social work, speech pathology, electroencephalogram, and inhalation therapy. In addition, DePaul has specialty services such as helicopter pad, pediatrics, chemical dependency, poison control, and alcohol rehabilitation.

The Veterans Administration Hospital has 129 medical and surgical beds and 47 nursing home beds. Occupancy is currently 74 and 96 percent, respectively. In 1982, patient care was given to 3,000 inpatients and 18,000 outpatients. Staffing consists of 13 physicians, 3 general surgeons, 9 internal specialists, 1 psychiatrist, 65 RNs, 40 LPNs and nurses aides, and 21 other staff.

The F.E. Warren AFB Hospital has 32 medical/surgical beds and 8 obstetric beds. The average annual occupancy rate is approximately 72 percent. The service population for the facility is between 13,000 and 14,000 persons, including active duty personnel and dependents, retirees

and dependents, and a few Army and Navy dependents. Staffing consists of 15 physicians, 32 nurses, 1 psychologist, and 1 other support staff. Services provided include an emergency room, X-ray, laboratory, diagnostic ultrasound, and physical therapy.

Apart from hospitals, health care is also provided by the emergency medical system, an integrated service of hospital facilities, an emergency 100-bed mobile hospital, communications, ambulances, helicopter service, 123 emergency medical technicians and paramedics, and other county and regional resources.

The Public Health Department, known as the City/County Health Unit, has two divisions, Nursing Services and Environmental Health. Nursing Services has a staff of 23 including supervisors, nurses, and others housed in a central Cheyenne building which is inadequate for the staff due to size and location. The Environmental Health Division handles 13 separate programs and is staffed by 10 persons. The Division is housed in a building separate from Nursing Services which is too small to accommodate current staff and facilities. Current staffing levels are low relative to State standards.

In addition to the above services, there are two nursing homes, several medical and dental clinics, and a Family Practice Residence Center in the county. Both nursing homes are at capacity. There are two private medical clinics in the county that are staffed by six pediatricians, three RNs, two LPNs, assistants, specialists, and office staff. Total private physicians in Laramie County number 91; there are approximately 40 dentists in the county.

#### **2.1.6.2.5.2      Platte County**

The primary health facility in Platte County is the Platte County Memorial Hospital and Nursing Home located in Wheatland. With an average occupancy of 44.5 percent, the hospital has a staff of 25 physicians, 13 RNs, 8 LPNs, and 16 nurses aides. Services include a 24-hour physician-staffed emergency room, operating and recovery rooms, cardiac and respiratory care, and obstetrics, among others.

The Public Health Department has 4 RNs on staff. There is no county health doctor.

Other health facilities in Platte County include the nursing home affiliated with the hospital and four senior citizen apartment/boarding house complexes located in Wheatland and Guernsey.

#### **2.1.6.2.5.3      Kimball County**

Kimball County's only hospital has 30 beds and an average occupancy of 52 percent. There are 3 family practice physicians on staff, 14 RNs, 4 LPNs, 20 nurses aides, and other technicians and staff. Services include X-ray, surgery, laboratory, cardiac care, obstetrics, ultrasound, and a nursery. Although there is no Kimball County health department, there is emergency transport available through the Kimball County Ambulance Service staff of 10 emergency medical technicians, and the Fire Department's backup unit. One of the family practice physicians serves as the county physician in lieu of a formal public health agency.

#### **2.1.6.2.6      Human Services**

##### **2.1.6.2.6.1      Laramie County**

Human services for Laramie County are provided by both public and quasi-public agencies. These agencies deal with problems and needs or provide services that help preserve quality of life. Determination of impacts on services which influence quality of life, and associated needs and problems, are often highly controversial. The following agencies are the primary human service delivery organizations in Laramie County.

The Alcohol Receiving Center, a 24-hour detoxification center, serves the 4county area of Laramie, Albany, Goshen, and Platte counties. Professional staffing is by 7 counselors who attended 521 persons in fiscal year (FY) 1983. The facility can hold only four beds, with two rollaway beds to expand capacity to six. Approximately four people per month are turned away.

The Cheyenne Halfway House for Alcoholics (located with the Alcohol Receiving Center) is a residential treatment facility for persons with alcohol problems. Services are offered to residents of Laramie, Platte, Albany, and Goshen counties but primarily utilized by Laramie County. The Halfway House has a capacity of 11 residents. The facility is usually full and currently has a waiting list of four people. The Halfway House had 119 admissions in FY 1983.

New Morning Awareness House, operated by Southeast Wyoming Mental Health Center, provides information and education on prevention and early intervention of substance abuse problems to youths and their families. Programs are presented for schools and community organizations, and informal counseling is offered to youths and their families at the House. The staff consists of 2 full-time and 1 quarter-time counselor, assisted by approximately 65 volunteers. Inadequate staff size is a constraint to provision of services such as in-depth, long-term counseling.

The Alcohol Traffic Safety Program, operated under the auspices of the Southeast Wyoming Mental Health Center, is a prevention, education, and referral program for individuals convicted of driving while under the influence of alcohol. Staffing consists of one full-time counselor and one half-time secretary. Though there is no established capacity, groups larger than 15 convicted drivers necessitate additional classes.

Pathfinder, a statewide drug abuse treatment center for all ages, provides outpatient services in counseling, biofeedback, and methadone treatment. Staffing is four full-time and two part-time professionals, with outside administrative support. Annual clients served number 125 with a monthly active caseload of 110 individuals. The agency is housed in a renovated dairy processing plant, which is currently large enough to accommodate the present caseload.

Project Hope is an outpatient counseling program for youth, alcoholics, and their families, providing individual, family, and group counseling services. The staff includes a director, a full-time counselor, a volunteer, and a half-time secretary. The current staff is at capacity given the current caseload. Clients must often wait 1 to 2 weeks for their first appointment.

The F.E. Warren Social Action Agency provides outpatient drug and alcohol abuse prevention and rehabilitation services to all Air Force employees as part of a family counseling team established onbase. Other programs include equal opportunity complaint processing, human relations education, and the staff assistant program. Staffing includes seven Air Force personnel.

The Department of Public Assistance and Social Services provides public assistance income maintenance, social services, food stamps, and the Low-Income Energy Assistance Program. Current staffing is 28 professionals with a staff-to-population ratio of 1 to 2,517. Space is considered adequate at present although it is operating at capacity.

The Community Center on Domestic Violence and Grandma's Safe House provide services to *battered and abused women and their children*. The current staff-to-client ratio is 1 to 24.7, with services being provided to female clients by 7 persons. The existing facility is filled to capacity (nine persons) nearly half the time.

The YWCA Rape Crisis Center provides advocacy, education, and support services to victims of sexual assault and to the community as a whole. The Cottonwood YWCA is a group home for young unmarried pregnant women and girls. The Rape Crisis Center has one paid director and 29 volunteers. The Cottonwood YWCA has one paid part-time counselor, one part-time secretary/bookkeeper, one part-time director, and two housemothers. There is a current staff shortage, according to standards for trained staff set by the State Department of Health and Social Services. The physical facilities are adequate to meet present demands. Approximately 26 percent of the inpatients and all of the outpatients are from Laramie County. The remaining inpatients are from the balance of the state.

The Cooperative Ministries for Emergency Assistance (COMEA) is a 24-hour emergency shelter for unemployed transient persons without children. It is staffed by 1 full-time person and 40 volunteers who handle 2,172 cases annually. The facility can accommodate 25 persons per night; occupancy averages 20.

The Salvation Army provides a wide range of emergency and disaster material, and counseling services, including an extensive free meals program, with 4 paid staff and 170 volunteers. This agency is currently operating with a deficit.

Community Action of Laramie County provides assistance to the elderly, unemployed, and low-income population. Services include employment counseling, training and referral services, clothing, shelter, food, utility bill assistance, and others.

The Community Solar Greenhouse, sponsored by Community Action of Laramie County, is a prototype, passively heated greenhouse, built and operated by volunteers. Most of the food produced is distributed to local low-income and senior feeding programs. The facility is currently adequate and could accommodate a higher level of use by volunteer gardeners.

The Wyoming Food Clearinghouse is a private, nonprofit corporation which collects and distributes salvaged and donated surplus food. A large part of the Clearinghouse's food supply comes from the Colorado Food Clearinghouse. The Wyoming Food Clearinghouse does not have direct access to some surplus food supplies as it lacks facilities, equipment, and staff necessary for membership in the nationwide food collection and distribution organization, Second Harvest. The Clearinghouse is run by 10 volunteers and has active participation by 13 member agencies.

The Community Interagency Board is a coordination group consisting of eight board members, two from each of four independent nonprofit organizations: NEEDS, Inc., Help Line, One-to-One Tutoring, and Volunteer Information Service/Volunteer Action Center. NEEDS, Inc. provides emergency short-term assistance such as food, clothing, bedding, furniture, health care, funds for rent and utilities, transportation, and the like for residents of Laramie County. The Volunteer Information Service and Volunteer Action Center conduct volunteer recruitment workshops, sponsor Community Awareness Week, serve as a clearinghouse for volunteers,

and publish a resource manual on social services in Laramie County. One-to-One Tutoring provides volunteers to tutor elementary through high school students on any academic subject. Help Line is a volunteer telephone crisis hotline.

Youth Alternatives, a citywide program for youths between the ages of 10 and 18, provides services to divert youths from the court system and alternatives to probation as well as substance abuse, family, and individual services. Present professional staff is 7.5 for a staff-to-client ratio of 1 to 154. In FY 1983, clientele numbered 1,155 or an estimated 96.25 per month.

The Attention Home is a foster care home for children 11 to 19 years of age. It provides a supervised home atmosphere for children who must be out of their own homes for short periods of time. Referrals to the Attention Home are usually received from the Department of Public Assistance and Social Services, Awareness House, Mental Health Center, ministers, courts, and schools.

The Southeast Wyoming Mental Health Center, Laramie County Branch, served 2,573 clients of all ages in FY 1983. Although the existing facility is inadequate, a new facility is under construction and will be occupied shortly by the staff of 16 professionals.

The F.E. Warren AFB Mental Health Clinic is part of the base hospital operations, and is colocated with that facility. The Clinic provides crisis intervention services, couples therapy, drug and alcohol evaluations, command evaluations including the Personal Reliability Program, family advocacy as related to administrative processes, and referral services. Staff includes one psychiatrist, one psychologist, one clinical social worker, and one administrative technician.

The Cheyenne Housing Authority provides senior citizen and low-income housing, senior nutrition programs, and senior social services. The housing program has a staff of ten full-time equivalent personnel. The nutrition program employs 26.5 staff, and the social services program has 10 full-time equivalent staff. Eligible clients for the senior citizen programs of the Housing Authority are citizens age 62 and over. The housing, nutrition, and social services for senior citizens are operating at capacity.

In Laramie County, as of April 1983, there were 12 day care centers, 5 group day care homes, and 101 family day care homes, not including providers who take care of children in private homes. All of these day care facilities are certified through Laramie County Department of Public Assistance and Social Services.

The STRIDE Learning Center is a private nonprofit agency that provides preschool education for handicapped and developmentally disabled children from birth to 5 years. A program for emotionally disturbed preschoolers is being initiated.

#### 2.1.6.2.6.2 Platte County

The primary human service agencies in Platte County, both located in Wheatland, are the Department of Public Assistance and Social Services and the County branch of the Southeast Wyoming Mental Health Center. The two basic programs provided by the Department are administered through the Public Assistance-Income Maintenance component and the Social Services component. Staffing includes two family and community service specialists, the county manager, and four other support staff.

The Mental Health Center provides personal outpatient services including individual, marital, family, and group counseling crisis intervention, psychological testing, alcohol and drug counseling, and other programs. Staffing includes four clinicians and one clerical support person.

Other human services include a transient fund collected by the Ministerial Associates for use by transient families for food, lodging, or gas; and the Wheatland Salvation Army, which also has limited funds for transient lodging, meals, and transportation.

#### 2.1.6.2.6.3 Kimball County

Human services delivery in Kimball County is provided for by a public welfare office, a nursing home, and a senior center, all located in Kimball, and regular visits from a representative of the Panhandle Community Action Agency, the Panhandle Mental Health Center in Scottsbluff (a speech therapist), and the Sidney Mental Health Center satellite (a caseworker). Kimball residents in need of mental health or other services generally travel to Scottsbluff.

Community Action services are provided in Gering (Scotts Bluff County), and consist of expectant mother services, nutrition services for children under five, distribution of government-supplied commodities, free immunization to school age children, home weatherization, and others. Kimball staff has been reduced in recent years to one person and office space is shared with the local Head Start program. Clientele is mainly local low-income families and individuals.

As of July 1, 1983, the Department of Public Welfare has become a branch of the Nebraska State Department of Social Services. Services include income maintenance programs, such as Aid to Families with Dependent Children and food stamps, administration of programs such as day care, transportation, homemaker services, child abuse casework, and medical services for the aged, blind, and disabled. In addition, indigents are provided emergency food and shelter assistance. While caseloads vary from month to month, at any given time there are about 340 cases.

#### 2.1.6.2.7 General Government

Within the Area of Concentrated Study there are eight local governments of concern: Laramie County, Cheyenne, and Pine Bluffs; Platte County and the towns of Wheatland and Chugwater, Wyoming; and Kimball County and the City of Kimball, Nebraska. Although other local governments are present in the Region of Influence, they would experience negligible impacts due to the Proposed Action and therefore are not addressed further.

#### 2.1.6.2.7.1 Laramie County

Laramie County government is administered by a three-member Board of Commissioners and several elected officials. The County offers a wide range of internal services through the County Clerk's office to the balance of County government, as well as a diversity of public services through the various County departments such as the Clerk, Treasurer, Assessor, Sheriff, Attorney, Clerk of the Court, Planning, Zoning, County Engineer, Road and Bridge, Extension Agent, and others. County payroll records indicate that annual average total staffing has grown from 88 persons in 1963 to 266 persons in 1982; staffing also essentially doubled between 1975 and 1981. Staffing has recently remained stable at around 270 persons. Space for general administration consists of 16,916 sq ft, mainly in the City/County Building. Maintenance and storage space in the County shop totals 12,168 sq ft. Space for both administrative and shop purposes is overutilized. The County's vehicle and equipment fleet is in generally good condition.

#### **2.1.6.2.7.2      City of Cheyenne**

The City of Cheyenne has a mayor-council form of government with three Council committees and nine Council members. Total staffing has grown from 397 in 1977, to its present (1983) level of about 480 persons. Administrative space is located almost entirely in the new (1979) Municipal Building and consists of 47,822 sq ft. In addition, the City has active shop and storage facilities at the Happy Jack Road shop (22,914, sq ft), 15th and Snyder Avenue (7,260 sq ft), the Salt Shed north of the airport (1,800 sq ft), and Hangar No. 101 (129,000 sq ft leased). The City has a fleet of over 500 vehicles and equipment that is in generally good condition.

#### **2.1.6.2.7.3      Town of Pine Bluffs**

Pine Bluffs, incorporated in 1909, operates under a mayor-council form of government, with a Council comprising 4 members. Town government staffing consists of 14 full-time and 9 part-time persons. Town-owned capital facilities include the Town Hall (which includes the Police Department and jail), a garage, a fire house, two equipment garages, an ambulance garage, six pump houses, three warehouses, and a swimming pool facility. The Town capital equipment fleet is diverse and includes police, fire, maintenance, rescue, and other vehicles.

#### **2.1.6.2.7.4      Platte County**

Platte County government is administered by the Board of County Commissioners consisting of 3 Commissioners elected at-large to staggered 4-year terms. Including elected officials, June 1983 staffing totaled 70 full-time persons, of which 18 persons were assigned to the Road and Bridge Department. Major capital facilities include the courthouse (10,000 sq ft of administrative space) and approximately 5,500 sq ft of shop/storage/office space. The capital equipment fleet is dedicated almost entirely to road and bridge maintenance and is in generally good condition.

#### **2.1.6.2.7.5      Town of Wheatland**

Wheatland government operates under a mayor-council form of government with 4 Council members elected at-large to staggered 4-year terms. Due to population increases brought about by construction of the nearby Laramie River Station, staffing increases were experienced but total staff has stabilized at about 45 persons. The Town Hall (7,500 sq ft) and shops provide the bulk of capital facilities owned by the Town. The capital fleet is in good condition.

#### **2.1.6.2.7.6      Town of Chugwater**

Chugwater, incorporated in 1919, operates under a mayor-council form of government with 4 Council members. Town staffing is two persons, a part-time clerk and full-time constable/maintenance man. The Town owns two buildings, the Town Hall, which includes the library and fire house, and a new warehouse.

#### **2.1.6.2.7.7      Kimball County**

Kimball County government is administered by a three-member Board of Commissioners and several elected officials including the Clerk, Treasurer, Assessor, Clerk of the Court, County Attorney, and other departments such as Civil Defense and Highways. Staffing has remained virtually constant at about 50 persons for 20 years or more. The courthouse provides 10,500 sq ft of general administrative space. County maintenance space is divided between three

locations. Space for both administration and maintenance is considered adequate. The County equipment and vehicle fleet is mainly devoted to highway maintenance and is considered to be in generally good condition but barely adequate for the County's needs.

#### **2.1.6.2.7.8      City of Kimball**

The City of Kimball has a mayor-council form of government with general administration performed by the City Administrator/Engineer and the City Clerk. Permanent staffing has remained steady at 40 employees for many years. Administrative space, located entirely in City Hall, totals 2,190 sq ft, and shop space totals 2,600 sq ft. Administrative and shop space are able to accommodate existing levels of service. The City vehicle and equipment fleet is considered to be in good condition and adequate to meet the City's needs.

#### **2.1.6.2.8      Libraries**

##### **2.1.6.2.8.1      Laramie County**

Library services in Laramie County consist of the County Public Library system, the Community College Library, the Wyoming State Library, and several special libraries. Within the County system, libraries are located in Cheyenne (Central Library), Pine Bluffs, and Burns; the system operates one bookmobile. According to recommended standards of the Wyoming State Library, the system is inadequate in per capita space, books per capita, staff per population, and per capita expenditure. The Central Library has capacity for a maximum of 150,000 volumes and presently contains over 100,000. Staff is presently at capacity.

Additional library services are provided to Laramie County residents by the Laramie County Community College Library. Although the staff is at capacity, the library now meets or exceeds national standards for college libraries.

The Wyoming State Library provides assistance to local libraries, but has no authority to intervene in local decisionmaking. The library provides an extensive collection of government documents as well as services for the blind and physically handicapped. In addition to the State Library, there are 16 other special government agencies and institutional libraries in Laramie County.

##### **2.1.6.2.8.2      Platte County**

Platte County library services include the resources of the Platte County Public Library system and the special medical library at County Memorial Hospital in Wheatland. The County Public Library system is made up of the main library in Wheatland and branches in Glendo, Guernsey, and Chugwater. Based on Wyoming State Library guidelines, services provided are adequate in terms of total system space, books, budget per capita, and staff-to-population. However, space is currently a problem in the main library due to inefficient design.

##### **2.1.6.2.8.3      Kimball County**

Library services for Kimball County residents include the Kimball Public Library, and access to all library resources within 11 counties in the western Nebraska Panhandle through the Panhandle Library Network system. The Kimball Public Library rates well for space and books per capita compared to Nebraska Library Commission service standards. Staff, although at capacity, is also considered adequate. However, low per capita expenditures are a constraint to maintaining current levels of service.



**The Panhandle Library Network system, initiated in 1969, provides support to libraries in the 11-county Panhandle region for service development, reference services, Inter-Library Loan access, workshops, books for the blind and handicapped, and other services.**

## **2.1.7      Utilities**

Utilities, as used here, include facilities provided in towns and cities for water treatment and distribution, wastewater collection and treatment, storm drainage, solid waste collection and disposal, and telephone service. (The affected environment related to electrical and other energy utilities is described in Sections 2.1.8 and 3.1.8)

The information in this section is based in large part on data and detailed analyses contained in a companion volume, the Utilities Environmental Planning Technical Report.

### **2.1.7.1      Region of Influence, Data Sources, and Analytic Methods**

#### **2.1.7.1.1      Region of Influence**

The Region of Influence for utilities includes the counties in two states where immigrating populations have been projected, as well as all the counties in which project deployment will occur. This area includes the six counties shown in Figure 2.1.7-1. The Region of Influence is the same for all subelements (water treatment and distribution, wastewater, solid waste, storm drainage, and telephones).

A much smaller geographic area than the six counties has received concentrated analytical attention. This area is comprised of the Areas of Concentrated Study. It includes those towns, cities, and special districts to which the immigrant populations have been allocated in this study. These include Cheyenne, Chugwater, Pine Bluffs, Torrington, and Wheatland, Wyoming; and Gering, Kimball, and Scottsbluff, Nebraska. They are also shown in Figure 2.1.7-1.

Other than the area around Cheyenne, the extent of these places is defined by the corporate boundaries of each community. The Cheyenne Urban Area for utilities is defined as:

- o    The city limits of the city of Cheyenne;
- o    The South Cheyenne Water & Sewer District, a special district south of the city;
- o    F.E. Warren AFB; and
- o    Areas north and east of the city which the Board of Public Utilities and others anticipate to be future growth areas that will first be annexed.

This inclusive boundary of the Cheyenne Urban Area is shown in Figure 2.1.7-2.

County boundaries have been used to define the Region of Influence because regulations (such as those dealing with individual homes' wells or septic tanks, and solid waste disposal sites) are administered by county jurisdictions, and because solid waste disposal sites tend to be city-owned but in nearby unincorporated locations. Storm sewers are in individual communities, but they drain to streams that traverse entire counties. Telephone service is provided by private utilities that serve multiple counties, even though the relevant service areas for telephones are within individual cities that lie within the county boundaries comprising the Region of Influence. Section 3.1.7.1 provides a fuller justification for the Areas of Concentrated Study.

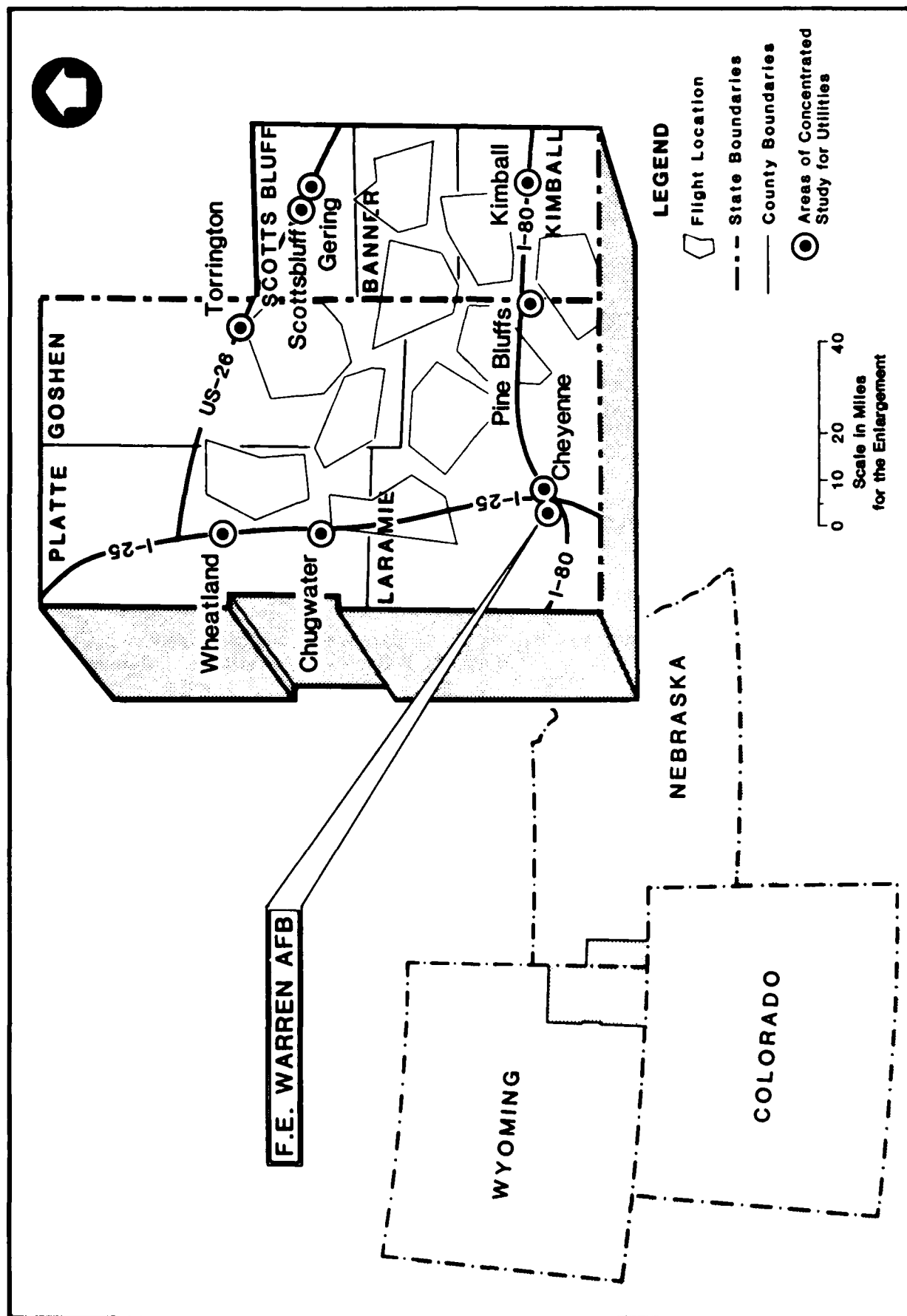
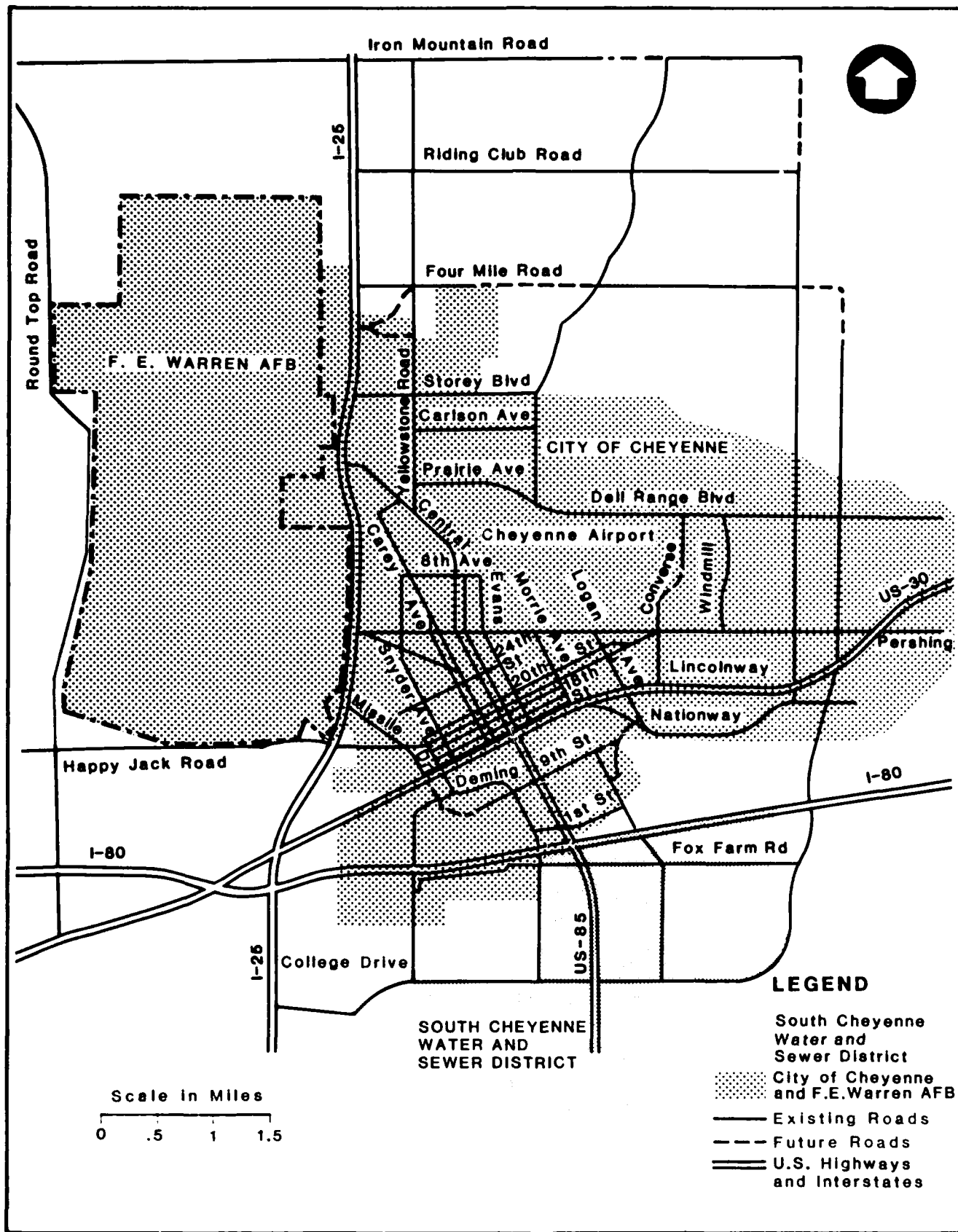


FIGURE 2.1.7-1 REGION OF INFLUENCE AND AREAS OF CONCENTRATED STUDY FOR UTILITIES



**FIGURE 2.1.7-2 THE CHEYENNE URBAN AREA AS DEFINED FOR UTILITIES**

#### **2.1.7.1.2      Data Sources and Analytic Methods**

Similar sources of data were used for all five subelements. They included technical literature, local agency personnel, and one field trip to obtain primary measurements. These sources are summarized below.

##### **2.1.7.1.2.1      Literature Sources**

Generally accepted environmental engineering texts and technical publications were used only sparingly for standards-of-practice to derive such things as unit water demands or runoff coefficients not available from local agencies or which could not be measured as primary data in the field. References to such publications are noted throughout, and the full bibliographic citations are given in Appendix D.

##### **2.1.7.1.2.2      Group and Agency Contacts**

Public works officials were contacted in all communities in the Region of Influence where immigrant, project-induced populations were estimated. Data were requested from these individuals to describe existing facilities and already planned future expansions or improvements.

Additionally, state officials in Wyoming and Nebraska were interviewed to obtain data on water, wastewater, and solid waste regulations and requirements for building and operating new facilities that may be necessary.

Several private service companies were also contacted to learn their current capacities. Among these were Mountain Bell Telephone Company, the Chugwater Telephone Company, and the United Telephone Company of the West, plus several private waste haulers in the Cheyenne area.

##### **2.1.7.1.2.3      Primary Data**

With one exception, no data were collected in the field by primary measurement methods to support the utilities work. The exception was a field surveying effort in Cheyenne to determine as-built information on the sizes and slopes of existing storm sewers and a few manhole elevations in the sanitary sewer system.

##### **2.1.7.1.2.4      Analytic Methods**

Adequacy of existing facilities was determined by comparison of capacities in place with demands for all services as reported by local officials. Where data concerning existing demand levels did not exist, current populations were multiplied by nominal unit loads (such as gallons per capita per day) to arrive at an estimate of existing demand conditions.

For the Cheyenne Urban Area (as defined for utilities), water supply, wastewater, and stormwater pipeline capacities were checked against mathematical model simulations of the existing flows in those systems. Deficiencies identified by the models were noted. Some waste treatment plants in Cheyenne and other communities were also simulated mathematically to determine the adequacy of existing plant types and sizes to treat current waste flows.

## **2.1.7.2     Existing Conditions**

### **2.1.7.2.1     Water Treatment and Distribution**

Everywhere in the Region of Influence, communities are now supplying their residents safe, potable water supplies, and each community has excess capacity to accommodate some additional growth. Torrington, Wyoming is studying feasible means for adding in-system storage for firefighting purposes. Torrington is the only community in the Region of Influence where an apparent deficiency in storage has been identified. The South Cheyenne Water & Sewer District imposed a moratorium on new water and sewerage taps in October 1983 to permit itself to plan distribution-main and sewer extensions necessary to accommodate expected growth. Hydraulic studies being performed by the District, like those performed in this study, should provide the necessary planning answers and lead to an early lifting of that moratorium.

The Cheyenne Urban Area uses both surface water and groundwater. All other Areas of Concentrated Study have groundwater supplied exclusively.

For the Cheyenne Urban Area, a simulated firefighting event at the Frontier Mall shopping center, with a nominal maximum-day demand (defined here as 2.3 times the average-day demand) imposed throughout the city as well, caused water pressures around the Mall to drop to 15 pounds per square inch (psi). This was caused by the existence in the pipe network near the mall of an 8-inch main. Other simulations demonstrated that a 12-inch main would adequately convey water during a firefighting event and maintain pressures above 20 psi, a nominal criterion or minimum standard-of-practice value.

Data for water supplies in communities throughout the Region of Influence are given in Table 2.1.7-1.

### **2.1.7.2.2     Wastewater**

With two minor exceptions, described below, sanitary sewer systems throughout the Areas of Concentrated Study perform well; and they contain sufficient and even excess capacities for existing waste flows. Exceptions occur in Torrington and in a portion of the sewer system in Cheyenne.

Torrington's sewers have been ingrown and clogged in some places by roots from nearby trees. This problem can be solved through a routine maintenance practice of routing the affected sewers with a root-cutting device.

In Cheyenne, a 12-inch sewer accepts flows from F.E. Warren AFB which are discharged through a 15-inch sewer. Predictably, the 15-inch sewer occasionally flows near full and overwhelms the capacity of the downstream sewer. This condition is known by officials of the Cheyenne Board of Public Utilities. The condition also occurred in computer simulations of the sewer system in this study.

Waste treatment, by contrast with sewer systems, is generally not adequate throughout the Region of Influence. Several of the nine studied communities are experiencing difficulties with sewage treatment plants now. In the Cheyenne Urban Area, the South Cheyenne plant, owned and operated by the South Cheyenne Water & Sewer District, is overloaded. It receives average daily flows of almost 0.7 million gallons per day (mgd) and peak monthly flows of nearly 0.8 mgd. The District is aware that the plant cannot normally meet its discharge quality requirements. Computer simulations in this study have determined that some processes at this plant should not be attempting to treat more than 0.55 mgd. Moreover, the Crow Creek

Table 2.1.7-1

**WATER TREATMENT AND DISTRIBUTION INFORMATION  
FOR COMMUNITIES IN THE REGION OF INFLUENCE**

<b>Community</b>	<b>1983 Service Population</b>	<b>Average Demand mgd</b>	<b>Peak- Day Demand<sup>1</sup> mgd</b>	<b>Storage Capacity MG</b>	<b>Surface Water Treatment Capacity, mgd<sup>2</sup></b>
Cheyenne Urban Area	58,954	12.8	33.5	22.0	26
Chugwater, WY	230	0.09	0.2	0.1	0
Gering, NE	8,560	2.7	6.5	1.2	0
Kimball, NE	3,290	0.92	2.8	1.0	0
Pine Bluffs, WY	1,117	0.56	1.43	0.22	0
Scotts- bluff, NE	14,440	4.0	12.0	2.8	0
Torrington, WY	5,540	1.4 <sup>a</sup>	3.5	0.35	0
Wheatland, WY	4,520	1.1 <sup>a</sup>	2.8	2.0	0
F.E. Warren AFB	3,630	1.0	2.5	N/A	0

1 Highest demand measured on a single day of a recent year. Not 2.3 times average-day demand, the nominal "maximum-day" demand sometimes used herein.

2 Groundwater suppliers are not required to provide treatment, except chlorination in some cases.

a Estimates based on 250 gpcd

N/A Data not available

MG Million gallons

mgd Million gallons per day

Source: Local official interviews for water system data.

plant in Cheyenne receives flows near its capacity (4.0 mgd). Local officials are fully aware of areawide treatment deficiencies, and in October 1982 they submitted a plan for correction to the State of Wyoming and the U.S. Environmental Protection Agency (EPA). The Cheyenne Board of Public Utilities, the South Cheyenne Water & Sewer District, and Laramie County await funding approval, although the State of Wyoming's Department of Environmental Quality has approved the plan in concept, and project design for the first phase of work is anticipated locally to be completed by September 1984.

Pine Bluffs has a lagoon system that is undersized for today's population. Plans for expansion, like those in Cheyenne, have already been prepared.

Wastewater conditions for communities throughout the Region of Influence are summarized in Table 2.1.7-2.

#### 2.1.7.2.3 Solid Waste

Every community studied in the Region of Influence has existing collection equipment and disposal sites that are adequate for today's solid waste loads. Daily loads range from 0.6 tons per day at Chugwater to 182 tons per day for the Cheyenne Urban Area. Pine Bluffs has the shortest remaining life at its landfill site (2 years), but it has access to a new Laramie County landfill near Burns, Wyoming.

Existing unit loads have been assumed for each community to be 5.0 pounds per capita per day (ppcd). Data from F.E. Warren AFB indicate that the unit solid wasteload is only 2.76 pounds per resident per day, and that value was used to estimate existing and all future garbage quantities for the base.

Toxic and hazardous waste generators in the Region of Influence generate very small quantities of these materials. These generators either recycle the materials or ship the waste residue to approved sites for disposal outside the Region of Influence and, in fact, outside the states of Wyoming and Nebraska.

F.E. Warren AFB is a "small quantity generator" of hazardous and acutely hazardous materials as defined by the Resource Conservation and Recovery Act. This means it produces and stores at the base less than 1,000 kilograms (kg) or 2,200 pounds of hazardous wastes per month and less than 1 kg of acutely hazardous waste per month. Therefore, unlike larger generators, the base is not limited to storage of 90-days' generation of these materials. In fact, F.E. Warren AFB generates and stores about 500 pounds per month of a dilute solution of sodium chromate from the Minuteman missile support equipment. The Defense Property Disposal Office has the responsibility for contracting for the disposal of these materials. All other hazardous wastes produced at the base are routinely sold for recycling or are hauled away for reclamation. These include 500 gallons per month of contaminated fuels and spent lubricants, 275 gallons of contaminated helicopter fuel (JP4), and a very small quantity of spent battery acid. (Quantities of reclaimed and recycled materials, such as these, are permitted by the regulations to be excluded from the quantity determination of amounts a generator may generate and store.)

#### 2.1.7.2.4 Stormwater

An examination of peak runoff rates was made for communities in the Area of Concentrated Study in which appreciable (roughly greater than 1 percent) land use change would be induced by the project such that runoff rates might be noticeably increased. These communities included Cheyenne, Gering, Kimball, Pine Bluffs, Scottsbluff, Torrington, and Wheatland. All of these communities have some storm sewers in part of their developed areas, but most also use roadway swales and drainage ditches along roads to convey stormwater.



Table 2.1.7-2

**WASTEWATER INFORMATION FOR COMMUNITIES  
IN THE REGION OF INFLUENCE**

Community	1983 Service Population	Average Waste Flow, mgd	Peak-Month Waste Flow, mgd	Municipal Wastewater Treatment	
				Type <sup>1</sup>	Capacity mgd
Cheyenne Urban Area	58,954	8.5	10.3	AS,TF	9.1
Chugwater, WY	230	0.03	(0.06) <sup>a</sup>	Lagoon	N/A
Gering, NE	8,560	1.35	(2.7)	Lagoon	1.93
Kimball, NE	3,140	0.3	(0.5)	AS	0.58
Pine Bluffs, WY	1,117	0.1	0.2	Lagoon	0.09
Scotts- bluff, NE	14,440	2.5	3.4	Aer. Lagoon,+	3.14
Torrington, WY	5,540	0.55	(1.0)	Lagoon	1.2
Wheatland, WY	4,520	0.3	(0.5)	Aer. Lagoon,+	0.5
F.E. Warren AFB	3,630	0.6	N/A	None	None

<sup>1</sup> AS = Activated Sludge  
 TF = Trickling Filter  
 Lagoon = Non-aerated ponds  
 Aer. Lagoon,+ = Aerated lagoons plus solids removal facilities

<sup>a</sup> Values in parentheses are estimates

N/A Data not available

Source: Local official interviews for wastewater data.

Only Cheyenne has existing problems of serious magnitude with respect to stormwater. These occur in the most developed downtown areas where storm sewers in place are very old and undersized. Computer simulations of 2-year and 10-year storm events confirmed that existing storm sewers will flood relatively frequently. City officials have reported that the existing systems fill to overflowing in one-third to one-half of the downstream pipes once or more each year. The computer model determined that diameters of the downstream storm sewers should be 1.5 to 2 times larger.

New growth areas in Cheyenne, where project-induced populations can be expected to move, are controlled with respect to storm drainage by ordinances requiring developers to install adequate storm drainage and detention facilities.

South Cheyenne includes considerable flat terrain where drainage problems have occurred in the past.

All other communities reported little or no existing problems with storm drainage, although several reported current studies underway to determine if further storm sewers should be added.

#### 2.1.7.2.5 Telephone Service

Telephone service is provided by Mountain Bell for most communities in the Areas of Concentrated Study in Wyoming. Nebraska communities and Torrington, Wyoming, are served by United Telephone Company of the West. The Chugwater Telephone Company serves the town of Chugwater. Excess capacity exists at all these communities.

F.E. Warren AFB has a small central telephone exchange of its own, connected to the Mountain Bell system. Four hundred and fifty AFB telephone lines are connected through this facility. An additional 50 lines (for Building 250) are routed directly off the base into the Mountain Bell system in Cheyenne. Still further, 1,300 line pairs serve the housing complex on the base of which 1,030 are currently being used. Mountain Bell's cables onto the base to serve all these needs are near capacity, and large increases in service needs would require new telephone cable to be strung to the base.

Again, telephone service in all community systems is adequate today, and the two companies routinely plan and install capacity expansions as required.

The information in this section is based in part on data and detailed analysis contained in a companion volume, the Utilities Environmental Planning Technical Report.

## **2.1.8 Energy Resources**

Energy resources to be assessed in conjunction with the proposed project include electricity, natural gas, petroleum products, and coal. These account for the majority of the energy consumed in the study area. Analysis includes energy sources, distribution systems, transmission lines, and effects upon consumers.

The information in this section is based upon data and detailed analysis contained in the Energy Resources Environmental Planning Technical Report.

### **2.1.8.1 Region of Influence, Data Sources, and Analytic Methods**

#### **2.1.8.1.1 Region of Influence**

The Region of Influence for energy resources (Figure 2.1.8-1) is defined as the service areas of three rural electric companies plus Cheyenne Light, Fuel and Power Company which supplies electricity to the 100 silos scheduled to receive Peacekeeper missiles. The rural electric companies are the Wyrulec Electric Company, the Rural Electric Company, and the Wheatland Rural Electric Association. In addition, the Region of Influence includes the energy utility service areas of the cities and towns, identified as receiving project-induced population. Specifically, these include Cheyenne, Chugwater, Pine Bluffs, Torrington, and Wheatland, Wyoming; and Kimball, Gering, and Scottsbluff, Nebraska.

The Region of Influence encompasses all direct project energy impacts, both in Cheyenne and the Deployment Area. For towns outside the Deployment Area facing population impact, the Region of Influence also includes the service areas of their respective electric and natural gas utilities. Local gasoline and diesel distributors are included within the defined Region of Influence. The only identified coal user affected by the project is the heating plant on F.E. Warren AFB which is included.

None of the electrical and only one of the two natural gas utilities produce its own supply; nearly all utilities buy from regional wholesalers. While increased demand on the regional electrical grid or natural gas pipeline system may be anticipated to result from the project, this added demand is expected to be negligible at the regional level and thus neither the regional electric nor natural gas supplies are considered in detail.

The analysis in Section 3.1.8.1 narrows the Region of Influence for each energy resource to an Area of Concentrated Study. In most cases, the Area of Concentrated Study for each energy resource was determined by comparing peak, project-related consumption to 1982 consumption. Those locations where minimal energy impacts are likely to occur due to the project were eliminated, and the bulk of the environmental analysis was concentrated on locations where potentially significant impacts may occur. The Area of Concentrated Study for the four energy resources are:

- o Electricity - The service area of the three rural electric companies mentioned above; Cheyenne Light, Fuel and Power Company; and the electric departments of Kimball, Pine Bluffs, and Wheatland;
- o Natural Gas - The cities of Cheyenne, Kimball, Torrington, Pine Bluffs, and Wheatland;
- o Petroleum Products - The counties of Platte, Goshen, and Laramie, Wyoming; and Banner, Kimball, and Scotts Bluff, Nebraska; and

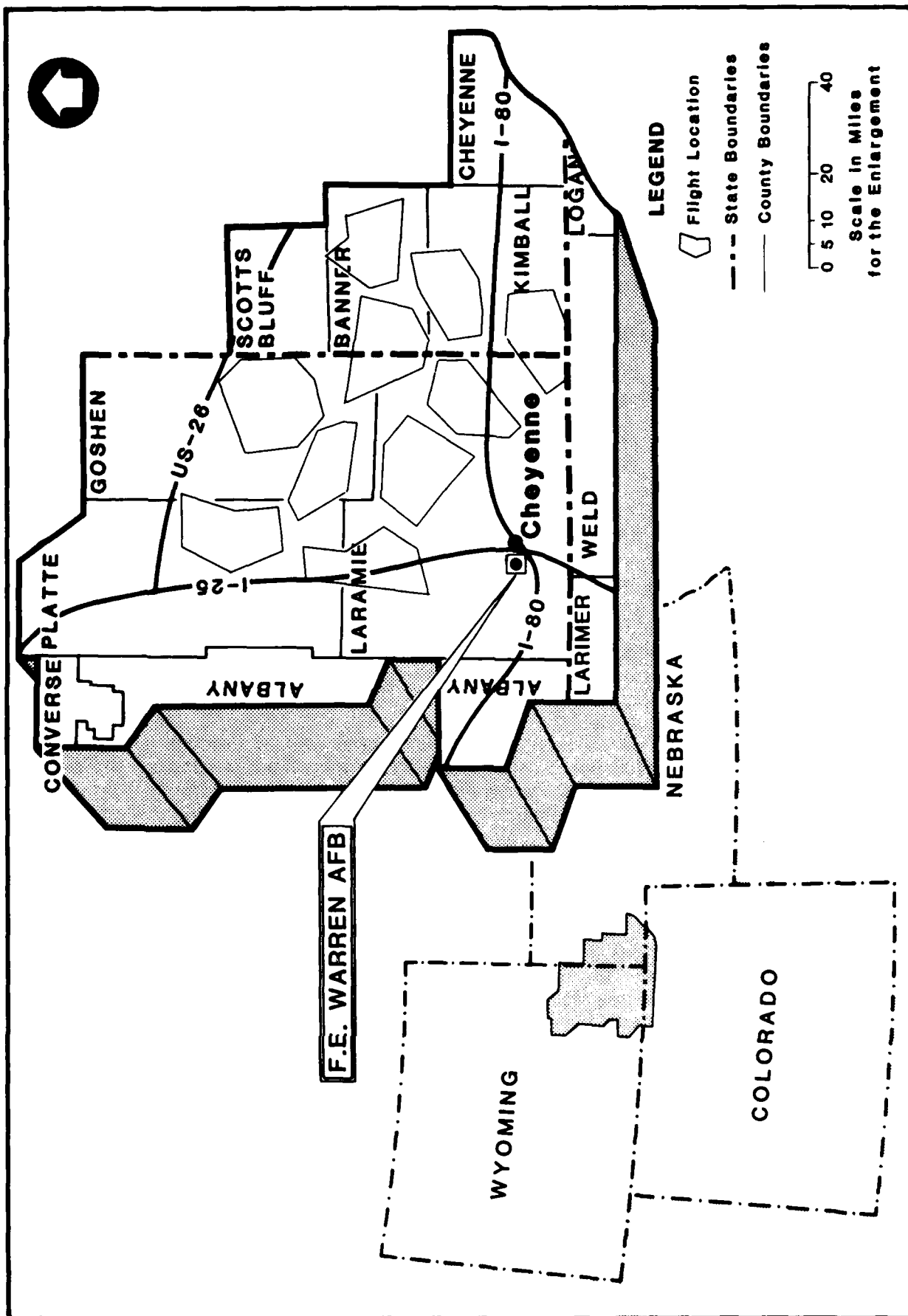


FIGURE 2.1.8-1 REGION OF INFLUENCE FOR ENERGY

- o Coal - F.E. Warren AFB.

The rationale for selection of these Areas of Concentrated Study can be found in Section 3.1.8.1.

#### 2.1.8.1.2 Data Sources and Analytic Methods

Some of the important sources of energy data for the Region of Influence were:

- o Federal Energy Information Administration;
- o Wyoming and Nebraska Energy Offices;
- o State public utility commissions;
- o Local electric and natural gas utilities; and
- o Local fuel wholesalers.

Members of the engineering staff at F.E. Warren AFB were interviewed to determine electrical, natural gas, and coal use at the base and in the missile Deployment Area. Base petroleum fuel use data were obtained from the Fuels Allocation Officer.

#### 2.1.8.1.3 Analytic Methods for Existing Conditions

Data obtained from interviews with local energy utility managers are summarized in tabular form for the most current year for which data are available (generally 1982). For natural gas and electricity, the information presented includes number of customers, total consumption, average residential use, standardized monthly costs, and other data needed to draw a summary of each utility. Regional wholesale suppliers are also characterized and their capacity to supply energy needs within the Region of Influence is discussed. Brief accounts of regional and national energy supply are provided for perspective.

Gasoline use in Wyoming was calculated from sales tax data available at the town level. In Colorado and Nebraska, only statewide fuel use figures were available. Per capita fuel usages were calculated in these instances as well as for diesel fuel in Wyoming. Local estimates of fuel consumption were then calculated using 1982 population figures.

#### 2.1.8.2 Existing Conditions

##### 2.1.8.2.1 Electricity

##### 2.1.8.2.1.1 Regional Situation

Nebraska and Wyoming are both net exporters of electricity. Wyoming exported approximately 60 percent of the 26 million megawatt hours (MWh) generated within the state in 1980. Coal-fired generating plants provide the bulk of the generating capacity in Wyoming. In Nebraska, nuclear power plants generate 50 percent of the state's power with coal generation accounting for most of the remainder.

Few of the local electrical companies in the Region of Influence own any generating facilities, and those that do rarely use them due to the availability of cheaper regional power. The regional wholesalers own most of the high voltage transmission lines in the area. Major wholesale distributors to the Region of Influence include the Western Area Power

Administration, Tri-State Generation and Transmission Association, Pacific Power and Light Company, and the Nebraska Public Power District. Together they account for over 15,000 megawatts (MW) of generation capacity and electrical sales of 74 million MWh.

Although the Western Area Power Administration's electrical output is fully committed, the remaining wholesalers together have ample capacity to serve the Region of Influence through the 1980s. The region is generally in a very favorable position from an energy supply standpoint, including electrical energy. Two large generating stations located in or near the Region of Influence are the Laramie River Station, with an existing net generating capacity of 1,500 MW, and the Rawhide Power Project, due to start generating in 1984. These projects make the Region of Influence a net electrical energy exporter for the first time.

#### 2.1.8.2.1.2 Local Distributors

Electricity in the Region of Influence is distributed either by town electrical utilities or by rural electric associations. For the most part, a town electric utility serves only the town and its immediately surrounding area. Rural electric associations serve the intervening, lightly populated, rural areas and often the smaller towns. These associations were formed in the 1930s and 1940s with the assistance of the federal Rural Electrification Administration. They own little, if any, generating capacity of their own. Their electric supply comes from regional wholesalers.

Three rural electric associations, Wheatland Rural Electric Association, Wyrulec Electric Company, and the Rural Electric Company, supply electrical power to 96 of the 100 silos to be converted for Peacekeeper missiles. In 1982 these 3 rural electric companies supplied over 31 million kilowatt hours (kWh) of electricity to the Air Force in the missile Deployment Area. Average annual electrical consumption at each silo is about 180 MWh, while peak demand is approximately 25 kilowatts (kW). Pertinent information on the rural electric associations is shown in Table 2.1.8-1.

Table 2.1.8-2 lists basic data on town electric utilities within the Region of Influence. Electrical service to Chugwater is provided by the Wheatland Rural Electric Association. The remaining towns, with the exception of Cheyenne and Scottsbluff, have their own municipal electric departments. Like the rural electric associations, the town utilities generally have no generating capacity of their own but import all electricity from large regional suppliers.

None of the rural or town electric utilities reported any major difficulties in meeting present customer electrical demand. Nearly all reported significant excess capacity in their local substations and distribution systems. The Kimball and Wheatland systems have supported populations at least 25-percent higher than at present.

The main supplier of electricity to F.E. Warren AFB is the Western Area Power Administration. In 1982 the base consumed 23.8 million kWh and had a peak electrical demand of about 4,000 kW.

#### 2.1.8.2.2 Natural Gas

##### 2.1.8.2.2.1 Regional Situation

Following a national trend, natural gas consumption in the region has dropped substantially in response to rapidly rising prices. Wyoming exported a net 85 percent of the 455 billion cubic feet (BCF) produced in 1981 and accounted for 2 percent of the national supply. On the other hand, Nebraska imported 98 percent of the 138 BCF consumed in that state in 1981. Residential consumers in both states paid less than the national average for natural gas.

Table 2.1.8-1

RURAL ELECTRIC ASSOCIATIONS  
1982

Name	Location	Number of Customers	Peak Demand MW	Annual Consumption kWh (x 10 <sup>6</sup> )	Mean Annual Use Per Residential Customer kWh	Monthly Residential Cost	Wholesale Supplier
Wheatland Rural Electric Association <sup>2</sup>	Wheatland, Wyoming	3,100	20	86	12,350	\$62	Tri-State <sup>1</sup>
Wyrulec Electric Company	Lingle, Wyoming	3,650	28	87	10,250	51	Western Area Power Administration Tri-State
Rural Electric Company	Pine Bluffs, Wyoming	6,000	43	153	11,760	58	Tri-State

<sup>1</sup> Tri-State Generation and Transmission Association, Inc.

<sup>2</sup> Includes service to the Town of Chugwater, Wyoming

Source: Unpublished data from Wheatland Rural Electric Association, Wyrulec Electric Company, and the Rural Electric Company.

Table 2.1.8-2

## CHARACTERISTICS OF CITY AND TOWN ELECTRIC UTILITIES - 1982

State	Distributor	Number of Customers	Peak Demand MW	Annual Consumption kWh (x10 <sup>6</sup> )	Mean Residential Consumption kWh/Year	Residential Monthly Cost \$	Wholesale Supplier
Wyoming	Cheyenne Light, Fuel and Power Company	28,000	83	462	6,250	23.83	Pacific Power and Light Company, Western Area Power Administration
Wyoming	Wheatland Electric Department	2,141	5.3	27	6,000	30.40	Western Area Power Administration, Laramie River Station
Wyoming	Torrington Electric Department	3,052	9.2	46	5,125	16.38	Western Area Power Administration, Pacific Power and Light Company
Wyoming	Pine Bluffs	696	1.6	7	6,000 <sup>c</sup>	34.00	Western Area Power Administration, Laramie River Station
Wyoming	Chugwater <sup>2</sup>	500-600	1.5	8	6,000 <sup>c</sup>	37.07	Wheatland Rural Electric Association
Nebraska	Kimball Electric Department	1,700	4.1	18	6,040	35.43	Nebraska Municipal Power Pool
Nebraska	Gering Electric Department	3,349	17.7	54 <sup>b</sup>	6,000	25.41	Western Area Power Administration, Nebraska Municipal Power
Nebraska	Nebraska Public Power District (Scottsbluff-Terrytown)	6,334 <sup>a</sup>	27	148	6,000	41.00	Nebraska Public Power District

<sup>1</sup> Residential customers only, mean monthly cost

<sup>2</sup> The Wheatland Rural Electric Association serves the Chugwater area. The values shown here are for its Chugwater substation.

<sup>a</sup> Residential customers only

<sup>b</sup> 1981 data

<sup>c</sup> Assumed - no specific data

Source: Unpublished data provided by the distributors.



Two regional producers of natural gas supply the towns and cities in the Region of Influence. They are Colorado Interstate Gas and Kansas/Nebraska Natural Gas Company. Neither distributor indicated any supply or distribution problems during the past several years. No interruption of service to customers has occurred during this period. In 1982 total Colorado Interstate Gas natural gas production was 323.2 BCF. Kansas/Nebraska Natural Gas Company production was 93.5 BCF. Both companies report ample supplies to serve foreseeable demand.

#### 2.1.8.2.2 Local Distributors

Natural gas distribution to the Region of Influence is considerably different from that described for electricity. In general, natural gas transmission lines serve only cities or sizable towns. From 80 to 95 percent of the dwellings in the gas service areas use natural gas for heating. The rural areas are not served and the isolated farmhouses and the smaller towns must use propane, heating oil, or electricity for heating.

Table 2.1.8-3 summarizes the natural gas supply statistics for towns and cities in or near the Region of Influence. Cheyenne's apparently high total gas consumption is partially explained by the fact that until recently Cheyenne Light, Fuel and Power Company supplied gas to Wycon, a large producer of nitrogen fertilizers west of town. Average yearly residential use of natural gas is also shown in Table 2.1.8-3. It varied from 143 thousand cubic feet (MCF) in Laramie to 117 MCF in Torrington in 1982. Actual average yearly consumption is closely tied to the winter weather. In Cheyenne the 1982 heating degree days of 7,534 was fairly close to the average of 7,255.

Chugwater has no natural gas system. The homes are heated by wood, electricity, coal, or propane.

Although a coal-fired hot water plant heats the major portion of F.E. Warren AFB, buildings at the southern end of the base and three tracts of housing on the base, are heated by natural gas. The gas is supplied by Cheyenne Light, Fuel and Power Company. Consumption on the base was 332,872 MCF in 1982 (F.E. Warren AFB Civil Engineering Office 1983).

#### 2.1.8.2.3 Petroleum Products

##### 2.1.8.2.3.1 Regional Situation

Crude oil production in Wyoming totaled 126 million barrels (MMB) in 1981, 4 percent of national production. Only 5.1 MMB of oil were produced in Nebraska. Consumption of gasoline and distillate fuel oil (including diesel) in Wyoming was 375 million gallons (MG) and 523 MG, respectively. The respective figures for Nebraska were 788 MG and 376 MG. Between 1979 and 1982 gasoline consumption dropped by 14 percent in Wyoming and 23 percent in Nebraska.

##### 2.1.8.2.3.2 Local Consumption of Gasoline

The fuel distribution network in the Region of Influence relies upon a combination of pipeline and truck delivery for supply to local distributors. This system is highly flexible. Competing private supply companies assure a rapid response to new fuel needs. The price and availability of fuel is far more heavily influenced by regional and national supply and demand than by local (e.g., individual town or city) demand. The 1982 gasoline consumption in the Region of Influence is estimated at 76 MG and diesel fuel consumption is estimated at 23 MG.

Table 2.1.8-3

## CHARACTERISTICS OF MUNICIPAL NATURAL GAS UTILITIES - 1982

Town	Distributor	Number of Customers	1982 Gas Sold (MMCF)	Mean Annual Residential Gas Use (MCF)	Avg. Monthly Residential Cost (\$)	Wholesale Supplier
<u>Nebraska</u>						
Kimball	K/N <sup>1</sup>	1,425	280	128	37.82	K/N
Gering	K/N	3,000	478	122	39.02	K/N
Scottsbluff	K/N	6,050	1,179	125	39.94	K/N
<u>Wyoming</u>						
Torrington	K/N	2,260	389	117	37.50	K/N
Wheatland	K/N	1,825	314	124	39.62	K/N
Cheyenne	Cheyenne LF&P	23,636	14,200	129	46.00	CIG <sup>2</sup>
Pine Bluffs	Cheyenne LF&P					
					- Included under Cheyenne -	

<sup>1</sup> K/N Kansas/Nebraska Natural Gas Company, Inc.

<sup>2</sup> CIG Colorado Interstate Gas

Source: Unpublished data from Kansas/Nebraska Natural Gas Company, Inc.; Cheyenne Light, Fuel and Power Company.

Local distributors supply the fuel needs of F.E. Warren AFB. The current supplier is the Fleischli Oil Company. Fuel allocation at F.E. Warren AFB is carefully managed. The 1982 gasoline consumption was 729,000 gallons. The goal for 1983 gasoline usage is for a 9-percent reduction. If met, fuel use would be the same as that achieved in 1980 (F.E. Warren AFB Fuel Allocation Office 1983). Use of diesel fuel at the base was 79,000 gallons in 1982. The goal for 1983 is for a 17-percent reduction in diesel use versus 1982.

#### 2.1.8.2.3.3 Refineries and Regional Fuel Supply

The Cheyenne area has a single petroleum refinery, Husky Refinery, with a capacity of 30,000 barrels per day (bbl/day). In 1982 it produced nearly 5 MMB of gasoline products and over 2 MMB of diesel fuels (Husky Oil Refinery 1983). Most of its crude oil comes by pipe from the Rocky Mountain area. Some oil is trucked in from wells near Greeley, Colorado.

Regional fuel supply to the Cheyenne area occurs via truck and rail shipments. A refined petroleum products pipeline (the WYCO pipeline) also delivers refined fuels to the Cheyenne area. Local distribution to retailers is handled by about a half dozen local wholesalers. Data on quantities handled is generally unavailable due to competitive reasons.

#### 2.1.8.2.4 Coal

##### 2.1.8.2.4.1 Regional Situation

In 1982 Wyoming's production and distribution of coal accounted for 12 percent of total U.S. domestic production and distribution. Approximately 108 million short tons of bituminous coal and lignite were produced in Wyoming in 1982. Almost all of this total output was strip-mined and shipped by rail or used by mine-mouth generation plants. Total consumption of coal in Wyoming in 1980 was approximately 15 million short tons.

Nebraska's produces no major amounts of coal. In 1981, consumption of coal in Nebraska totaled approximately 5.3 million short tons.

##### 2.1.8.2.4.2 Local Coal Use

Notable coal consumption in the Region of Influence is limited to a few locations. The largest consumers are Laramie River Power Station (7 million tons per year) and Rawhide Power Station (920,000 tons per year) at full power output.

The central heating plant of F.E. Warren AFB heats about 1.15 million square feet (sq ft) of building space and consumed 10,800 tons of coal during the 1981 to 1982 season (F.E. Warren AFB Civil Engineering Office 1983).

## **2.1.9      Transportation**

The study of transportation includes the various modes of travel used for the safe and efficient movement of persons and goods. Its focus includes transportation planning, and the design and operation of roads, railroads, aviation facilities, public transit, and pedestrian and bicycle facilities, as well as the interrelationships between these travel modes.

The project will generate additional travel demand, especially in the Cheyenne area. Extensive analysis was performed to evaluate the effects of this demand.

Of particular importance is the study of the roads to be used by the stage transporter vehicle and other project-related traffic, and the evaluation of necessary roadway improvements. This system includes those roads used for transporting missile components to the selected missile Launch Facilities.

The information in this section is based upon data and detailed analysis contained in the Transportation Environmental Planning Technical Report.

### **2.1.9.1      Region of Influence, Data Sources, and Analytic Methods**

#### **2.1.9.1.1      Region of Influence**

The geographical limits of the Region of Influence for transportation include Laramie, Goshen, and Platte counties, Wyoming; Kimball, Banner, and Scotts Bluff counties, Nebraska; and a corridor along Interstate 25 and adjacent rail lines in Colorado, encompassing Fort Collins, Greeley, and Denver (Figure 2.1.9-1). The Region of Influence includes construction sites directly disturbed by the project (particularly the work at F.E. Warren AFB), access roads, and the cable connections between missile flights.

The boundaries of the Region of Influence encompass all major transportation systems affected by major deliveries of materials, and movements of construction workers and vehicles to and from job sites. These include roadways, railroads, aviation, public transit, and pedestrian and bicycle facilities. The Region of Influence also includes transportation systems in areas where immigrant populations are expected to reside, shop, and use recreational facilities.

The Area of Concentrated Study is defined as an area approximately bound by Interstate 25, U.S. 26, Nebraska State Highway 71, Interstate 80, and portions of Kimball County, Nebraska and Laramie County, Wyoming, south of Interstate 80. Justification for the Area of Concentrated Study is discussed in Section 3.1.9.1.

#### **2.1.9.1.2      Data Sources and Analytic Methods**

##### **2.1.9.1.2.1      Sources of Existing Information**

For the roads analysis, information on roadway and traffic conditions was provided by the Wyoming Highway Department, the Nebraska Department of Roads, and engineering or planning departments on the county and local level.

For the railroad analysis, the state rail plans for Wyoming, Nebraska, and Colorado, including their most recent updates, were reviewed. The Wyoming State Public Service Commission provided data on statewide rail shipments originating and terminating in Wyoming. The

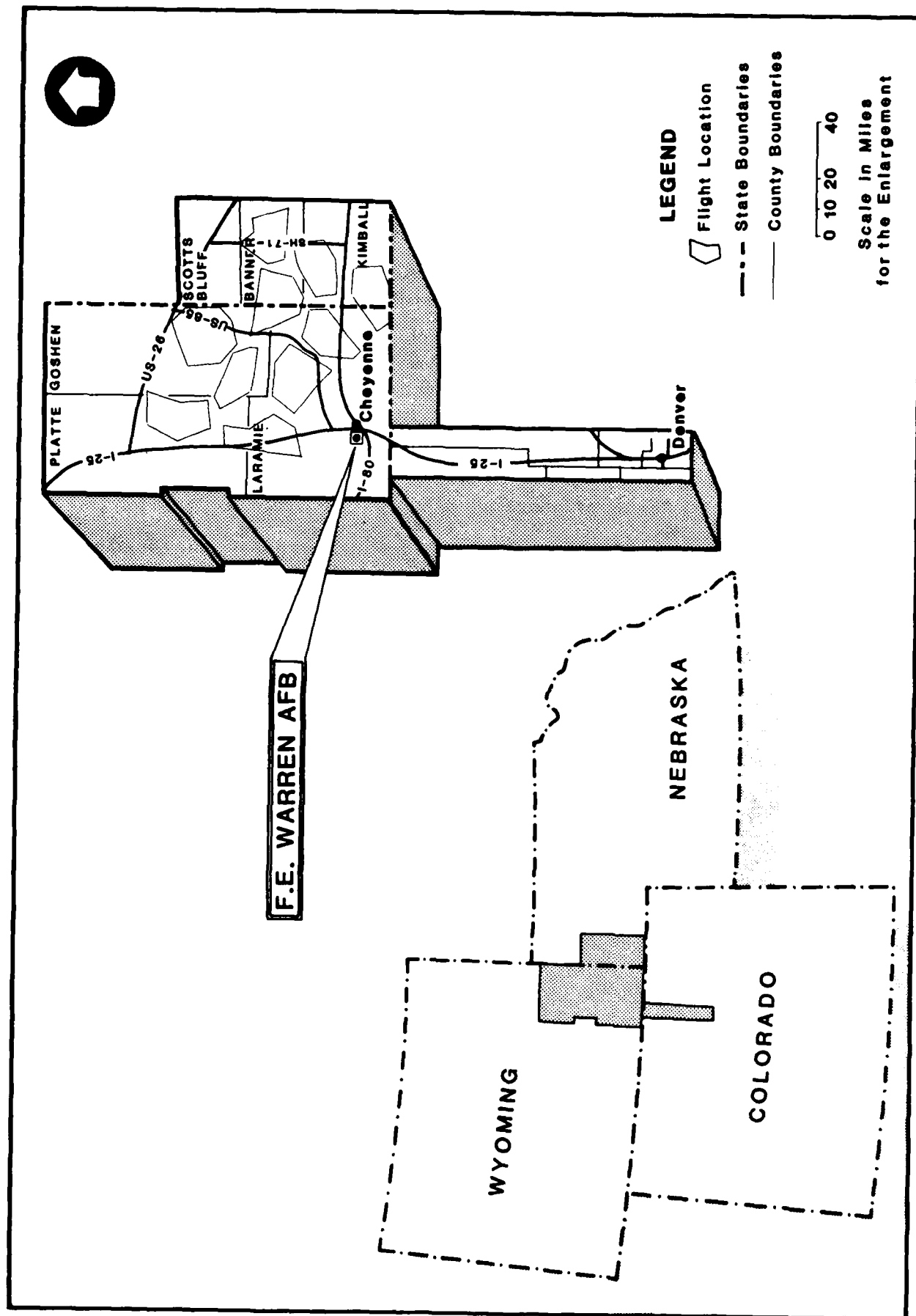


FIGURE 2.1.9-1 REGION OF INFLUENCE FOR TRANSPORTATION

Nebraska Public Service Commission and the Nebraska Department of Roads provided maps and data on rail operations in Nebraska. Both the Burlington Northern and Union Pacific railroads provided information.

For the aviation analysis, information was obtained from local airport officials. In addition, a large number of Federal Aviation Administration's (FAA) published reports, including the National Airport System Plan, were reviewed. State Airport System Plans for Wyoming and Nebraska, and the Cheyenne Airport Master Plan were also reviewed.

For public transit, information was obtained from the Cheyenne transit and taxi system and the intercity bus lines.

For the analysis of pedestrian and bicycle facilities, existing bicycle circulation data and accident data for both pedestrians and bicyclists were reviewed. Information on bikeway facilities was provided by the City of Cheyenne.

#### 2.1.9.1.2.2 Primary Data

In order to properly assess the project's impact, it was necessary to collect a substantial amount of data. For example, a road inventory was performed on the roads to be used by the stage transporter vehicle, as well as on other project-related rural roads. This inventory involved an extensive data collection effort of roadway characteristics. Data were also collected concerning traffic, roadway, and land use information at F.E. Warren AFB. Data gathered in this inventory were then used to determine the suitability of the existing routes for use by the stage transporter vehicle and to determine the need for improvements. Truck classification data were also collected at various locations within the Region of Influence.

The Wyoming Highway Department and the City of Cheyenne collected traffic volume data in the Cheyenne area. Similarly, the Nebraska Department of Roads collected traffic data at 36 locations in Kimball and Banner counties.

#### 2.1.9.1.2.3 Analytic Methods for Existing Conditions

The methodology for characterizing existing road and traffic conditions is described according to travel demand, traffic engineering, and physical condition of roadways. Travel demand for rural areas and small population centers was assessed through a review of current traffic volumes and historic traffic growth, and an understanding of local development trends.

Travel demand for the Cheyenne Urban Area was assessed by developing a computerized transportation model to simulate existing traffic conditions. The modeling approach followed procedures outlined in the National Cooperative Highway Research Program's Report 187, Quick Response Urban Travel Estimation Techniques and Transferable Parameters. Level of service, capacity, queuing, delay, and safety analysis were performed for traffic conditions for the roadway study network for the year 1983.

To assess the physical condition of roads that would be utilized by the stage transporter vehicle, a comprehensive road condition inventory was conducted on presently designated Minuteman transporter/erector routes. It was assumed that the stage transporter vehicle would use existing transporter/erector routes to the maximum extent possible. Data gathered during this inventory included roadway surface type, surface width, shoulder width, number of lanes, right-of-way width, and structural properties. In addition, information was gathered on structures such as bridges, culverts, and cattle guards, as well as potential obstructions such as rail crossings, utility crossings, and substandard horizontal and vertical curves. A computerized procedure was used to summarize both roadway and structure information, and

to store a detailed record of the physical condition of the affected roads. The same procedures were utilized for other project-related rural roads. Based on the extensive road improvements that may be required for the transporter/erector routes, it is anticipated that large quantities of aggregate materials may be necessary. Therefore, a detailed study was made to determine probable aggregate sources and likely haul routes.

For railroads, physical condition and rail yard capacity were evaluated, based on operational and capacity information provided by rail officials.

A demand and capacity evaluation of existing facilities at area airports was made using general procedures and criteria recommended by the FAA and a review of existing capacity analyses from these airports' master plans.

An analysis of existing bus and taxi service in the Cheyenne area, as well as intercity bus service, was conducted through a determination of extent of service areas, frequency of service, ridership, and potential for expansion.

For pedestrian and bicycle facilities in the Cheyenne area, the Cheyenne Bikeway Plan and related planning and development documents were used to determine existing and planned facilities.

#### 2.1.9.2 Existing Conditions

##### 2.1.9.2.1 Roads

##### 2.1.9.2.1.1 Cheyenne

The Cheyenne study area and the major roadways in the area are shown in Figure 2.1.9-2. The Cheyenne study area includes that part of the urban region that may be impacted during project implementation. Both the study area and the major roadways were determined through consultation with representatives of the Wyoming Highway Department, the City of Cheyenne, and Laramie County.

Particular attention was given to traffic operations at F.E. Warren AFB, which is primarily serviced by four gates. Gate No. 1 (Randall Avenue) is the main access for military personnel, civilian workers, and visitors. Gate No. 2 (Missile Drive) is utilized by military personnel, civilian workers, and delivery vehicles. Gate No. 5 (Central Avenue) is used for military operations, such as the movement of the missile transporter, and is normally locked. Gate No. 3 (Randall Avenue to Round Top Road) is accessed by a magnetic-card-actuated automatic gate system.

Traffic volume data for 1982, obtained from the Wyoming Highway Department, show Gate No. 1 to have a total average weekday volume of 12,500 vehicles. In comparison, Gate No. 2 has only a total average weekday volume of about 2,000 vehicles. At Gate No. 1, the queue of vehicles at times extends into the Randall Avenue/Interstate 25 interchange.

##### 2.1.9.2.1.2 Small Population Centers

Substantial project immigration, as a percentage of baseline population, was forecast for Wheatland, Chugwater, Pine Bluffs, Torrington, and Kimball. Therefore, the effect on local roadways was assessed through the review of traffic and roadway data, and discussions with local officials of these communities.

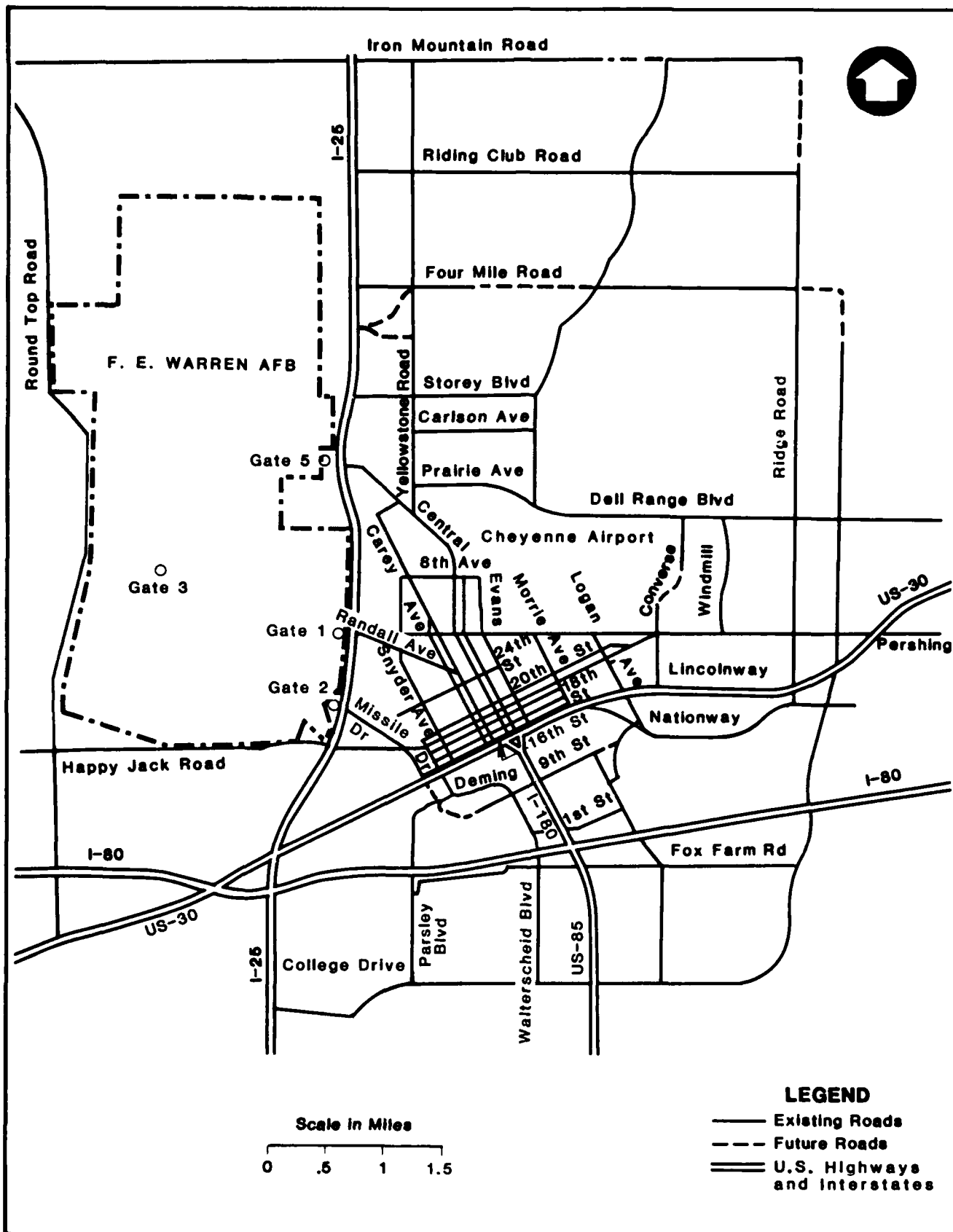


FIGURE NO. 2.1.9-2 CHEYENNE ROADWAY NETWORK



#### 2.1.9.2.1.3 Rural Roads

The Area of Concentrated Study is served by a network of national, state, and local roads. The region is traversed by two routes of the National System of Interstate and Defense Highways. Interstate 25 serves north-south traffic movement, while Interstate 80 serves east-west movement within and through the region. These traffic arteries are augmented by several state highways and county roads which serve population centers and rural areas of the Area of Concentrated Study.

Project-related roadways consist of transporter/erector routes, aggregate haul routes, and roads functionally classified as collectors or arterials. Many miles of these roads are gravel-surfaced, and serve local farm-to-market needs. Frequent maintenance generally keeps these gravel roads in good condition during much of the year. The poorest conditions occur during the period of spring thaw, when some roads may be nearly impassable on occasion. Table 2.1.9-1 presents a summary of existing physical conditions on the transporter/erector routes. This summary includes surface type and structural classifications as well as information on associated roadway elements. This information was used to determine the extent of improvements that may be necessary for the transporter/erector routes, some of which are maintained through the Defense Access Roads program. Inventory information was also collected for other project-related roads.

#### 2.1.9.2.2 Railroads

Two rail lines operate in the Area of Concentrated Study. The Union Pacific Railroad operates a major line, classified as a route required for defense, extending from Council Bluffs, Iowa, to Salt Lake City, Utah, which is then single-tracked to the West Coast. Other mainlines extend from this trunk line from Egbert, Wyoming, north to Torrington, Wyoming, and south to Denver, Colorado; and from North Platte, Nebraska, parallel to the North Platte River to the Torrington area.

Burlington Northern Railroad and its subsidiary, Colorado and Southern Railroad, operate a mainline from Cheyenne north through Wyoming and an unclassified line south toward Denver. A major Burlington Northern line runs north from Sterling, Colorado, to Bridgeport, Nebraska, and then parallels the North Platte River west into Wyoming.

#### 2.1.9.2.3 Aviation

##### 2.1.9.2.3.1 Cheyenne Airport

The Cheyenne Airport is the center for aviation activity in the Area of Concentrated Study. Rocky Mountain Airways and Frontier Commuter presently serve Cheyenne Airport. In the fall of 1983, Frontier Airlines discontinued jet service to Cheyenne. Replacement service has been provided by Frontier Commuter with three flights daily using Convair 580 turboprops. There are two fixed-base operators at the Cheyenne Airport, Aero Ventures and Sky Harbor Air Service, which provide a variety of services including fuel, aircraft rental and sales, air taxi and air ambulance service, flight training, major maintenance, hangars, and tiedowns. There are 14 multiengine and 69 single-engine general aviation aircraft based at Cheyenne with a total capacity of 108 tie-downs. Aviation fuel is stored in underground tanks and transferred to aircraft by tank trucks. Total fuel capacity is 142,000 gallons.

The only Air Force operations at the airport are the Civil Air Patrol and the Transient Alert, which provide service for military aircraft. U.S. Air Force aircraft that occasionally use the airport include T-39 twin jet executive aircraft, C-141 jet transports, and Boeing KC-135 jet tankers. Also based at Cheyenne Airport is the Wyoming Air National Guard, whose primary

Table 2.1.9-1

**TRANSPORTER/ERECTOR ROUTES  
SUMMARY OF PHYSICAL CONDITIONS FOR ALL COUNTIES**

<b>Description of Surface Type</b>	<b>Mileage</b>
Primitive Roads	0.00
Unimproved Roads	0.00
Graded and Drained Earth Roads	42.10
Soil Surface Roads	157.35
Gravel or Stone Roads Not Graded and Drained	3.70
Gravel or Stone Roads Graded and Drained	103.68
Bituminous Surface Treated Roads	0.00
Low Type Mixed Bituminous Roads	4.12
High Type Mixed Bituminous Roads	426.41
Low Type Bituminous Penetration Roads	40.10
High Type Bituminous Penetration Roads	21.59
Bituminous Concrete	1.14
Portland Cement Concrete Roads	169.71
Combination Type Roads	0.00
Other	0.00
<b>TOTAL Miles of Road:</b>	<b>969.90<sup>a</sup></b>

<b>Other Elements Description</b>	<b>No.</b>	<b>Structures Description</b>	<b>No.</b>
Substandard Curves <sup>1</sup>	62	Bridges	224
Buried Pipeline	42	Box Culverts	157
Overhead Cable	357	Reinforced Concrete Pipe	526
Buried Cable	22	Corrugated Metal Pipe	1,077
Silo Entrance Road	111	Metal Pipe Arches	111
Railroad Track	22	R.C. Arch Culverts	23
Overhead Sign	23	Cattle Guards	105

<sup>1</sup> Substandard curves are horizontal and vertical curves that would be unable to accommodate the required turning radius and configuration of the stage transporter vehicle.

<sup>a</sup> This figure includes mileage recorded on both sides (direction) of the Interstate system.

mission is to maintain aircraft proficiency in the Tactical Airlift Mission. The Air Guard operates eight C-130s. The unit also supports the Air Force in point-to-point airlift missions throughout the United States. The Air National Guard provides and maintains crash, fire, and rescue equipment at Cheyenne Airport. Eight pieces of equipment, including three pumpers, foam truck, and an ambulance are active. The equipment is jointly manned by the Air National Guard and the Airport Board which has three full-time employees assigned. Equipment and personnel are supplied by the Air Guard in exchange for a reduction in their joint user fee. The available service has been deemed adequate by airport officials. Activities of the Wyoming Army National Guard at Cheyenne Airport include aircraft maintenance and individual and unit training. The Army Guard operates eight UH-1H helicopters, six OH-58A helicopters, and one T42 Beechcraft Baron airplane.

From 1979 to 1982, the recorded number of aircraft operations at Cheyenne Airport decreased considerably. This was primarily due to the poor economy, the air traffic controllers' strike, and the reduced hours of control tower operation. The largest affected category was general aviation, dropping from 39,565 operations in 1979 to 25,105 in 1982. Passenger traffic for 1981 and 1982 was very stable with approximately 25,900 passengers for each year. Traffic in 1983 was well ahead of that pace, projected to be about 32,700 passengers for the full year. This increase is primarily due to changes in the airline fare structures.

Operations began to increase in 1983, due to longer control tower operating hours and an improving economy. Projecting the operations total for the first half of 1983 to a full year, operations increased from 55,735 in 1982 to about 75,000 for 1983. Seasonal peaks occur in the months of July and August. Traffic drops off in the winter months with the low generally occurring in December.

Approximately 100,000 square feet (sq ft) of parking space are available for 3 large commercial jet liners at the terminal. As many as 25 additional large aircraft may be parked at the airport when traffic is diverted to Cheyenne from other airports.

In recent years, pavement maintenance requirements have been increasing. The pavement of Runways 12/30 and 16/34 is in poor condition and requires continuous patching in areas of spalling concrete. Taxiways are in good shape. In order to improve the pavement structure, the FAA, in its Ten Year Plan (1980), recommended investments in paving and lighting of \$3.7 million during the first 5 years and \$2.4 million during the sixth through tenth years.

Parking in the terminal area has been a problem in recent years. In the area adjacent to the terminal, there are several commercial establishments which compete with the airport users for a limited number of spaces. Of the 280 parking spaces available in the terminal area, approximately 60 spaces are reserved for nonairport users, and 125 spaces are reserved for official and commercial users. Additional parking lots serve the military and commercial facilities at the airport, but they are located some distance from the terminal. The airport's management has identified the need for additional public parking facilities as a shortcoming at the present level of activity.

Traffic flow at the terminal pick-up and drop-off zones is also poorly defined and the existence of the United Airlines fountain on Eighth Avenue only adds to this problem.

#### 2.1.9.2.3.2 Area Airports

Other than Cheyenne Airport, the study area is dominated by small general aviation facilities. Only one airport, the Scotts Bluff County Airport in Scottsbluff, Nebraska, has scheduled commercial air carrier service. The remainder are in the basic utility and general utility categories.

The Kimball Airport was closely studied as the Kimball area is proposed for use as a dispatch station during project construction, and may therefore receive additional air traffic.

Stapleton International Airport in Denver is the main air carrier hub with almost 500,000 annual operations.

#### 2.1.9.2.4 Public Transit

Public transit in Cheyenne is provided by both buses and taxis. Jitney, Inc., a privately owned company, currently operates 2 bus routes with 1 bus operating on each route at 60-minute intervals. The system currently carries 300 to 400 passengers per week, with increases expected as people become more aware of the transit system as a viable transportation alternative. In addition, the Air Force operates a transit system at F.E. Warren AFB which is intended to provide circulation within the base. Intercity bus service to the area is provided by Greyhound and Trailways.

Taxi service in Cheyenne is provided by Checker-Yellow Cab which operates 24 hours per day on a demand call basis. It utilizes 10 taxis during the day and 5 taxis at night, and averages 400 fares per day, with single passenger trips constituting approximately 90 percent of the fares. Peak hours are 7:00 to 9:00 AM and 3:00 to 6:00 PM.

#### 2.1.9.2.5 Pedestrian and Bicycle Facilities

The City of Cheyenne has established a general development framework for a master bikeway network. These plans have been implemented as monies became available. However, bikeways are not a major priority of the City of Cheyenne. Recent sections of improvements have been constructed as a result of associated projects.

The majority of routes, paths, and lanes occur in the northern sections of the city, and are primarily due to the presence of large recreational facilities and major street renovation projects such as Dell Range Boulevard, Pershing Boulevard, 19th Street, and Logan Avenue. Major improvements in the south include the Interstate 180 Corridor project, which will include bike lanes.

The downtown area has an extensive pedestrian network consisting totally of sidewalks. The surrounding areas consist of a myriad of sidewalks and paved streets with intermittent areas of graveled streets and no sidewalks. Specific areas, particularly the southern and northeastern sections of Cheyenne, have concentrated areas void of formal pedestrian paths. In these areas particularly, the level of pedestrian and bicycle facilities are at present inadequate.

## **2.1.10      Land Use**

The land use resource consists of two elements: urban and rural land use. Urban land use and planning focuses on population-induced indirect project effects and impacts on the amount and type of developed and undeveloped land in urban areas, during both the growth and decline cycles of the project. It also addresses direct land use impacts in urban areas of alternative dispatch stations and roads. Rural land use and agriculture considers the direct impacts of project development of cable system expansion, transporter/erector road modifications, Launch Facility modifications, and establishment of required explosives safety Quantity Distance zones around the Launch Facilities. Indirect impacts on agricultural practices are also considered.

The information in this section is based upon data and detailed analysis contained in the Land Use Environmental Planning Technical Report.

### **2.1.10.1      Region of Influence, Data Sources, and Analytic Methods**

#### **2.1.10.1.1      Region of Influence**

##### **2.1.10.1.1.1      Urban Land Use and Planning**

The Region of Influence for urban land use includes Platte, Goshen, and Laramie counties, Wyoming, and Scotts Bluff, Banner, and Kimball counties, Nebraska (Figure 2.1.10-1). These six counties contain all areas where population immigration from the project was anticipated. The Area of Concentrated Study for urban land use includes the Cheyenne Urban Area and the communities of Wheatland, Pine Bluffs, and Chugwater, Wyoming, and Kimball, Nebraska, those areas where demand for housing – the primary developed land use – could exhibit land use impacts.

##### **2.1.10.1.1.2      Rural Land Use and Agriculture**

The Region of Influence for rural land use and agriculture coincides with that for urban land use. It contains the areas where all direct and indirect land use impacts from the project could occur. The Area of Concentrated Study for rural land use and agriculture comprises the Deployment Area where cable route, Launch Facility site, transporter/erector road, and Quantity Distance zone modifications are proposed.

#### **2.1.10.1.2      Data Sources and Analytic Methods**

##### **2.1.10.1.2.1      Urban Land Use and Planning**

The following analytic methods were used to determine existing conditions for urban land use and planning: 1) comprehensive land use plans, land use surveys, aerial photographs, and maps were analyzed to determine existing development patterns, the amount of vacant land within communities, and generalized development constraints; 2) local development regulations were analyzed; 3) existing per capita land acreages, by use category, were calculated and compared for different communities on the basis of land use standards; and 4) interviews were conducted with local planners and development officials to determine trends. In addition, primary data were collected from Laramie County Assessor's files on the number of vacant versus occupied platted lots in residential subdivisions in the county.

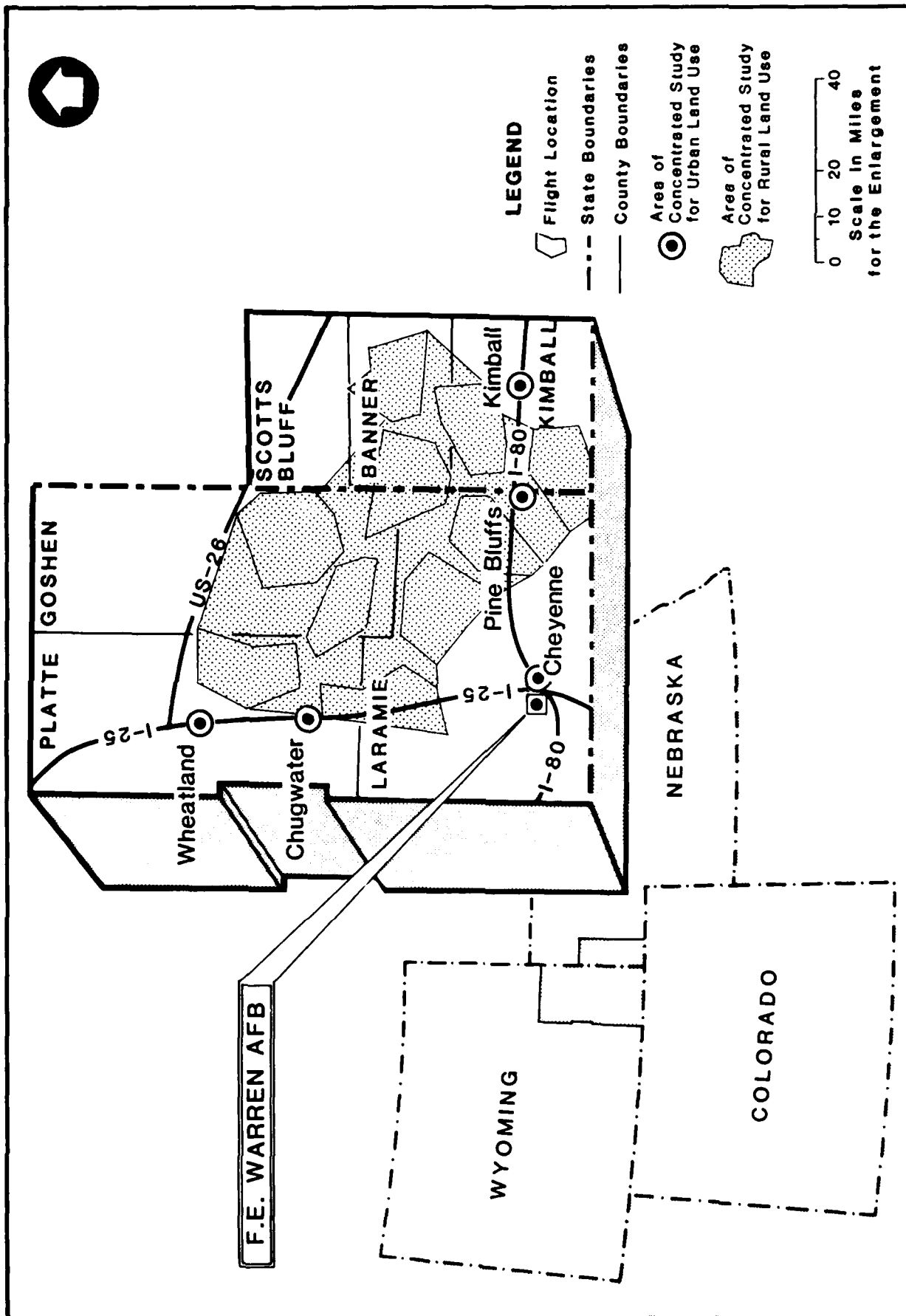


FIGURE 2.1.10-1 REGION OF INFLUENCE AND AREAS OF CONCENTRATED STUDY FOR URBAN AND RURAL LAND USE

#### 2.1.10.1.2.2 Rural Land Use and Agriculture

Rural land uses were analyzed through examination of census and map data, and satellite imagery. Site-specific agricultural land use data were obtained by interpretation of satellite and aerial photographs (with some groundtruthing), transferred to maps, and measured to provide an inventory of existing conditions. The primary data sources for rural land uses were Soil Conservation Service (SCS) soil surveys and Census of Agriculture data for the Region of Influence counties. Cable route analysis used LANDSAT 1:250,000 scale and Geographic Management Information System 1:158,400 scale satellite imagery, and 1:18,000 scale aerial photographs. Real estate data were analyzed to identify inhabited structures in the explosives safety zones. Agricultural management practices were determined from interviews with SCS and Agricultural Extension personnel and field observation.

#### 2.1.10.2 Existing Conditions

##### 2.1.10.2.1 Urban Land Use and Planning

Existing utilization of developed land and amounts of developable vacant land determine the capacity of urban areas to absorb growth in an orderly manner. Developed land refers to land that currently supports structures. Developable vacant land is land that is serviced or serviceable with utilities and has no serious environmental constraints such as floodplains or excess slopes that would preclude development. These two areas of concern, therefore, comprise the urban land use analysis. Table 2.1.10-1 presents existing land uses for Cheyenne, Wheatland, Pine Bluffs, Chugwater, and Kimball.

##### 2.1.10.2.1.1 Cheyenne, Wyoming

Land use maps for Cheyenne indicate that the developed portion of the urban area contained 42 percent residential land and 58 percent nonresidential land in 1982. Recent annexation and subdivision activities in the Cheyenne area have created an excess of vacant platted lots. There were almost 1,500 acres of vacant land within the city that year. A 1983 survey identified 2,472 vacant lots within residential subdivisions in the city of Cheyenne and 2,386 vacant lots in the zoned area extending approximately 5 miles from the city. Some of this activity appears to be speculative platting. Per capita land use standards and local interviews generally indicate some overbuilding of commercial property; other nonresidential uses are close to standards. Cheyenne annexed 2,449 acres between 1970 and 1982. Annexation has created pockets of county land, resulting in problems with services provision and inconsistent development standards often associated with leapfrog development. New development has generally located north and east of the city. Expansion to the west is limited due to the location of F.E. Warren AFB and the lack of access and services. South Cheyenne is oriented toward industrial and mobile home development.

Cheyenne and Laramie County have adopted a zoning ordinance, a subdivision ordinance, and land use plans, as well as an annexation policy adopted in 1982. Efforts are under way to develop additional land use management tools and to update the zoning ordinance.

##### 2.1.10.2.1.2 Wheatland, Wyoming

The town of Wheatland contained 2,223 acres in 1983. Of this amount, 56 percent is vacant. Residential uses comprise 34 percent of developed areas and nonresidential uses 66 percent. Recent population declines following construction of the Laramie River Power Station have created capacity in local facilities and infrastructure, indicating an ability to absorb future growth. Wheatland has a planner/building inspector and has adopted a land use plan, a subdivision ordinance, and a zoning ordinance.

Table 2.1.10-1

## EXISTING LAND USE IN CHEYENNE AND OTHER COMMUNITIES, 1983

Land Use	Cheyenne <sup>1</sup>		Chugwater		Wheatland		Pine Bluffs <sup>2</sup>		Kimball	
	acres	%	acres	%	acres	%	acres	%	acres	%
Total Residential	6,478.00	24.14	20.72	41.23	330.52	14.87	156.00	12.09	334.70	29.62
Single Family	6,211.00	23.14	17.09	34.01	220.02	9.90	143.62	11.13	288.45	25.53
Multifamily	267.00	0.99	1.25	2.49	45.25	2.04	6.13	0.48	28.75	2.54
Mobile Home	N/A	N/A	2.38	4.74	65.25	2.94	6.25	0.48	17.50	1.55
Commercial	1,005.00	3.74	3.17	6.31	28.10	1.26	63.00	4.88	136.77	12.11
Mixed Use	71.00	0.26	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Industrial	807.00	3.01	3.60	7.16	70.80	3.18	N/A	N/A	62.76	5.55
Public/Semipublic	3,374.00	12.57	6.40	12.74	99.73	4.49	34.00	2.64	86.38	7.65
Parks	373.00	1.39	N/A	N/A	33.70	1.52	8.00	0.62	21	1.86
Open Space	831.00	3.10	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vacant	11,853.00	44.16	16.36	32.56	1,244.44	55.98	802.00	62.17	195.83	17.33
Railroads & Highways	2,048.00	7.63	N/A	N/A	415.71	18.70	227.00	17.60	292.41	25.88
TOTAL:	26,840.00	100%	50.25	100%	2,223.00	100%	1,290.00	100%	1,129.85	100%

<sup>1</sup> Represents a 42-square mile area containing the City of Cheyenne, South Cheyenne, and adjacent areas for which existing land use maps are available. Single family and mobile home are combined. Mixed use represents downtown Cheyenne. Streets are included with other categories.

<sup>2</sup> Commercial and industrial uses are combined.

N/A Not available or not applicable



#### 2.1.10.2.1.3 Kimball, Nebraska

In Kimball, 35 percent of developed land is devoted to residential use and 65 percent to nonresidential use. The amount of vacant land is estimated at approximately 200 acres out of a total of 1,130 acres. Growth has generally located to the south. Utilities do not appear to be a constraint to future land development, and environmental conditions will not preclude development in most locations.

Kimball has adopted a zoning ordinance, a subdivision ordinance, and a land use plan. Opposition by 35 percent of property owners within 300 feet of a proposed mobile home park is grounds for permit denial. Until recently the city of Kimball and Kimball County had a joint planning commission. The City Manager performs planning duties.

#### 2.1.10.2.1.4 Pine Bluffs, Wyoming

Pine Bluffs contained 1,290 acres within the city limits in 1983. City boundaries extend well beyond development, creating large amounts of vacant land, approximately 800 acres. There are 115 vacant residential lots within the town that are either served or serviceable with water and sewer. Residential land comprises 32 percent of the developed area and nonresidential is 68 percent. Pine Bluffs has a zoning ordinance and land use policy plan, but no subdivision ordinance.

#### 2.1.10.2.1.5 Chugwater, Wyoming

Chugwater contains 50 acres of land of which 16 are vacant. The developed acreage is 62 percent residential and 38 percent nonresidential. Recent population declines following construction of the nearby Laramie River Power Station indicate that the town could support some additional growth with existing development. Chugwater has a zoning ordinance and a land use plan, but no subdivision ordinance.

#### 2.1.10.2.2 Rural Land Use and Agriculture

Existing conditions for rural land use focus on a description of agricultural land uses in those areas potentially affected by location of the 11 alternative cable routes (Figure 1.6.3-1) and throughout the Deployment Area where agricultural practices could be affected. Since all permanent modifications to Launch Facilities will occur within existing fence lines and transporter/erector road modifications will occur within existing rights-of-way, no specific land use analysis was conducted for those actions. The Air Force has, for planning purposes, established a required explosives safety distance for the project of 1,750 feet to inhabited buildings. Nine of the 100 Launch Facilities have inhabited structures within this stand-off distance. These include C-7 and C-10 in Banner County; D-4, D-9, and E-5 in Kimball County; E-9, E-11, and Q-5 in Laramie County; and T-5 in Platte County. All of the inhabited structures are associated with larger farm complexes which have additional uninhabited farm support buildings nearby.

Rural land in the Region of Influence is utilized primarily for agricultural production. The major products are beef from rangeland and winter wheat from dry land farming. Cash crop farming (largely wheat) predominates in Kimball, Scotts Bluff, and southern Banner counties in Nebraska. Large cattle operations are found in western Laramie County, Wyoming. Wyoming ranching and livestock practices differ from Nebraska's in that Wyoming is an open range state, which allows a rancher to leave his range holdings unfenced. Sheep and hogs are present throughout the Region of Influence but are found in much smaller numbers. Irrigated farming occurs to a lesser extent throughout the Region of Influence and is dependent upon either furrow or center pivot irrigation systems.

Primary management concerns for agricultural producers include water conservation, erosion control, and interference with agricultural practices, particularly agricultural market transport and harvest activities. Harvesting the larger farm acreages in the High Plains of eastern Wyoming and western Nebraska usually requires migratory teams of custom combine operators who travel from farm to farm throughout the region. Producers are busiest from spring through fall with activity peaks occurring during the spring (seeding crops and moving cattle to pasture) and late summer (winter wheat harvesting).

General land use characteristics along the proposed cable routes are shown in Table 2.1.10-2. Of the 11 routes, 2 will follow existing Minuteman cable routes which cross combinations of irrigated cropland, dry farmland, and rangeland. The remaining 9 routes will be located in 16.5-foot easements within 35-foot rights-of-way, some of which connect with existing road rights-of-way. Percentages of agricultural land uses in mile-wide corridors containing the rights-of-way are presented as existing conditions in the table.

Table 2.1.10-2

## CABLE LAND USES AND POTENTIAL CORRIDOR IMPACTS

Corridor	Total Acreage	Existing Conditions			Potential Corridor Impacts			
		Percent Irrigated	Percent Dry Farm	Percent Rangeland	Acres Irrigated	Acres Dry Farm	Acres Rangeland	Total Acres
PA1 <sup>a,b</sup>	5.5	0	75	25	0	3.8	1.7	5.5
RB2	9,278	0	13	87	0	11.9	39.2	51.1
PA3	9,228	2	22	76	1.1	11.3	49.1	61.5
PB1	12,355	3	7	90	4.0	9.6	66.0	79.6
PA2	10,025	0	49	51	0	27.6	37.0	64.6
SB1 <sup>a,b</sup>	50	18	17	65	9.0	8.5	32.5	50.0
RB1 <sup>a</sup>	16,496	8	5	87	4.2	5.8	86.0	96.0
PA4 <sup>a</sup>	13,930	3	43	54	1.9	46.2	39.3	87.4
PA5 <sup>a</sup>	15,587	5	37	58	1.0	43.2	54.6	98.8
S82	16,481	11	56	33	13.8	71.0	28.9	113.7
PD1	16,357	14	24	62	22.7	31.1	60.3	114.1

<sup>a</sup> Proposed action route

<sup>b</sup> Route follows existing Minuteman cable location. Acreage calculated on 35' easement x length of cable.

The nine remaining alternatives are combinations of routes that traverse cross-country corridors and connect with road rights-of-way. Acreages under existing conditions calculated for mile-wide corridor.

## **2.1.11      Recreation**

This section addresses regional (resource-based) recreation, which is related to federal, state, and other lands offering outdoor recreation opportunities; and local (user-based) recreation, which is primarily related to municipal and county-owned parks and facilities within urbanized areas.

The information in this section is based upon data and detailed analysis contained in the Land Use Environmental Planning Technical Report.

### **2.1.11.1      Region of Influence, Data Sources, and Analytic Methods**

#### **2.1.11.1.1      Region of Influence**

##### **2.1.11.1.1.1      Regional Recreation**

The Region of Influence for the regional recreation analysis is a circle with a 150-mile radius from Cheyenne, the area forecast to receive the greatest influx of population attributable to the proposed project. The 150-mile radius, which includes parts of Wyoming, Colorado, and Nebraska, represents a reasonable upper limit that a person living in Cheyenne can be expected to travel for the purpose of participating in outdoor recreation during a 1 or 2 day period. Figure 2.1.11-1 shows this Region of Influence. The Area of Concentrated Study, however, includes only Laramie, Albany, Platte, Goshen, and Carbon counties, where regional facilities are most likely to exhibit impacts from project-related population influx.

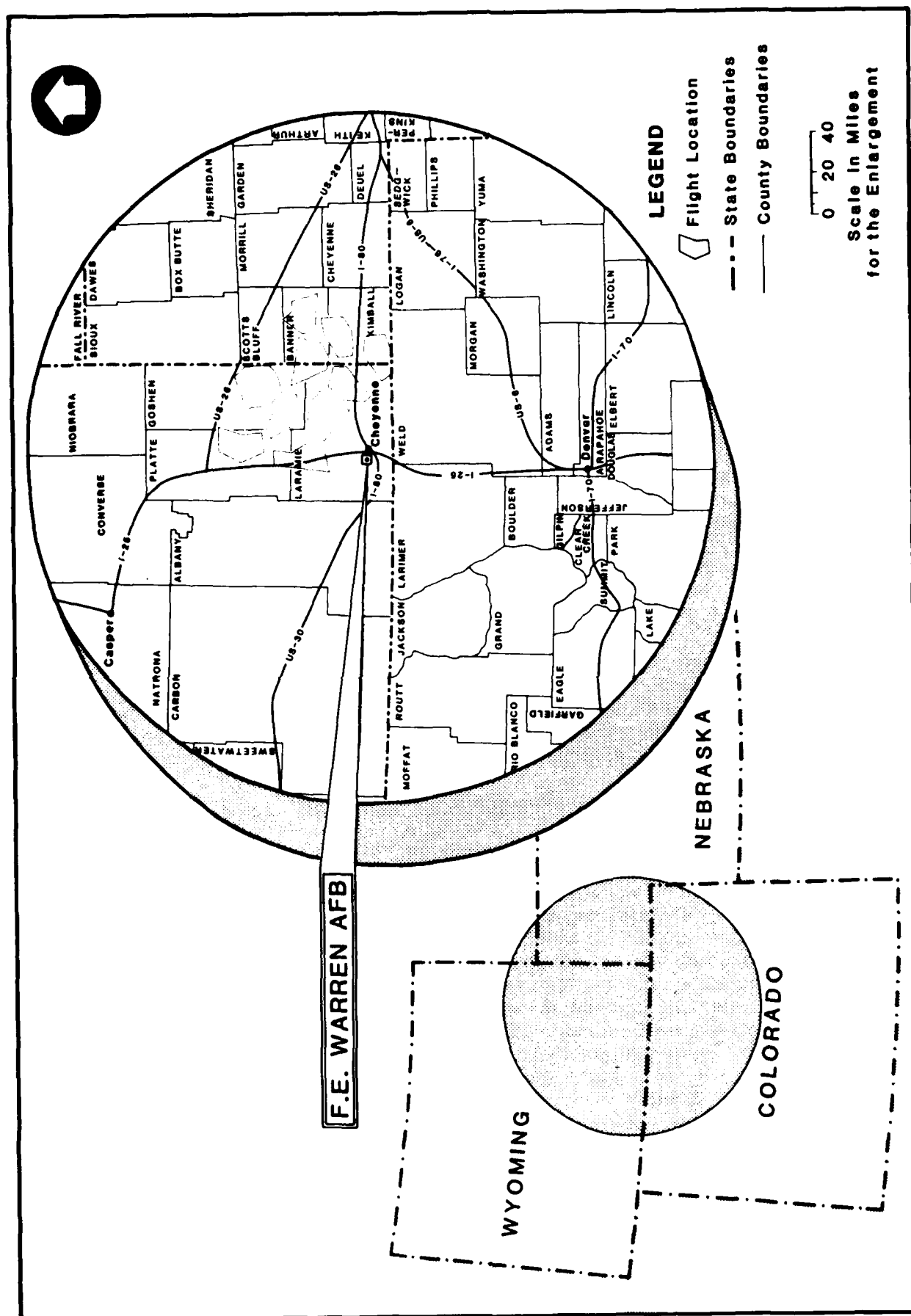
##### **2.1.11.1.1.2      Local Recreation**

The Region of Influence for local recreation coincides with that for urban land use (Figure 2.1.10-1). These six counties contain all areas where immigration from the project was anticipated. The Area of Concentrated Study for local recreation includes those urban areas where the majority of project-induced population is projected to settle - Cheyenne, Wheatland, Pine Bluffs, and Chugwater, Wyoming and Kimball, Nebraska.

#### **2.1.11.1.2      Data Sources and Analytic Methods**

##### **2.1.11.1.2.1      Regional Recreation**

Data pertaining to existing visitation and capacities at the various recreation areas within the Region of Influence were collected from park master plans, statistics maintained by regional recreation agencies, and verbal estimates made by recreation planners. The quality and availability of these data vary by jurisdictional agency as well as by individual recreational area. Agencies contacted include the National Park Service, U.S. Forest Service, U.S. Fish and Wildlife Service, Bureau of Land Management (BLM), Wyoming Recreation Commission, Wyoming Game and Fish Department, Colorado Division of Parks and Outdoor Recreation, Colorado Division of Wildlife, Nebraska Game and Parks Commission, South Platte Natural Resource District, Cheyenne Parks and Recreation Department, and others with jurisdiction over recreational lands within the Region of Influence. Field observations were made to verify estimates and eliminate data gaps. Visitation estimates were collected for ten individual activities: camping, picnicking, skiing, swimming, fishing, hunting, boating, hiking/horseback riding, snowmobiling/ cross-country skiing, and off-road vehicle use.



#### 2.1.11.1.2.2 Local Recreation

For the local recreation analysis, information was gathered from three primary sources: public documents, group and agency contacts, and field surveys. Documents used included parks and recreation master plans and comprehensive plans developed for cities and counties in the Region of Influence. The primary agencies contacted were local parks and recreation departments or, in their absence, local officials. Field surveys were used to supplement and update data from local agencies and available documents.

The local recreation analysis applied existing ratios, adopted standards, state standards from state comprehensive plans, and national standards from the National Recreation and Parks Association to estimated 1983 population figures for three separate categories: parkland, recreation facilities, and staffing. Current conditions in terms of the available supply and demand associated with these three components were evaluated. Facilities on F.E. Warren AFB and commercial recreation opportunities were also examined.

#### 2.1.11.2 Existing Conditions

##### 2.1.11.2.1 Regional Recreation

Existing visitation levels at various recreational areas within the Region of Influence are discussed in this section. These visitation levels, by recreational activity, form the basis on which project-induced recreation demand is allocated to each area.

A total of 86 publicly owned regional recreation areas (not including dispersed BLM lands) were identified within the Region of Influence; only 34 are within the Area of Concentrated Study. These areas include all or portions of 1 national park, 10 national forests, 6 national wildlife refuges, 22 game and fish areas, 24 state parks and recreation areas, and a variety of other recreational area types. Of these, one national forest and two national wildlife refuges, as well as all of the Wyoming state parks and identified game and fish areas, are within the Area of Concentrated Study. In addition, there are several water-based recreation areas under the jurisdiction of the City of Cheyenne and other agencies, as well as significant BLM acreage.

Medicine Bow National Forest, which consists of four separate units, is the most heavily visited area within the Area of Concentrated Study. The most popular activities occurring at the Forest are camping, hunting, and fishing. By contrast, Bamforth and Hutton Lake national wildlife refuges receive very low visitation.

Based on user data supplied by the Wyoming Recreation Commission, Glendo is the most popular of the four state parks followed in order by Guernsey, Curt Gowdy, and Seminoe. Fishing is a major activity at all areas except Guernsey, while boating is least popular at Curt Gowdy. Swimming is popular at Glendo and Guernsey. Camping exhibits relatively high use at all four areas. The game and fish areas generally receive much less use than the state parks with Lake Hattie, Twin Buttes Reservoir, and Wheatland Reservoir No. 3 exhibiting the highest visitation figures. Most of these areas emphasize fishing and hunting as recreational attractions, although the larger areas also offer boating, camping, picnicking, and swimming.

Sloans Lake in Cheyenne is an important regional resource primarily serving local residents. Swimming is by far the most popular activity at this area. Other recreational areas under the City's jurisdiction are Lake Absaraka (Country Club Lake) and Upper North Crow Reservoir. The latter area receives low use since no developed facilities exist.

#### **2.1.11.2.2      Local Recreation**

Parkland, recreation facilities, and staffing for Cheyenne, Kimball, Wheatland, Pine Bluffs, and Chugwater were evaluated for existing surpluses and deficiencies to determine impacts to these components due to baseline and project-related populations.

##### **2.1.11.2.2.1      Cheyenne, Wyoming**

The major provider of recreational land, facilities, and staff in the Cheyenne Urban Area is the City of Cheyenne Parks and Recreation Department. Several other service organizations supplement the City's facilities. These include Laramie County School District No. 1, Laramie County, the YMCA, and Laramie County Community College. None of the supplemental service organizations focus exclusively on providing recreation, and often their facilities are not available to the public on a regular basis. F.E. Warren AFB provides facilities for use by military personnel and Department of Defense civilian employees. Commercial recreation opportunities in Cheyenne make a significant contribution to public recreation. As with other commercial and retail enterprises, commercial recreation facilities and services have developed over the years in response to growing market support for such activities. This trend can be expected to continue.

Parks and recreation services were first offered by the City in 1973. The system is thus relatively new and is only beginning to necessitate replacement and increased maintenance of some facilities. The service area of the Cheyenne Parks and Recreation Department is within the city boundaries, although in actual practice the Department serves the Cheyenne Urban Area with a population of approximately 16,000 over the city population. There are no differential fees charged for services between city and county residents.

The Greater Cheyenne Recreation Commission has adopted a standard of 6 acres of developed parkland per 1,000 people in greater Cheyenne. The existing parkland base of 372.5 acres represents the total acreage for all community and neighborhood parks and developed ballfield complexes. If the acreage standard adopted by the City is applied to the total existing population, the resulting need is 390.2 acres, indicating that the Cheyenne Urban Area is currently deficient by 17.7 acres.

Included in the adoption of the parkland standard was a provision that "deficient neighborhoods are to be provided with 5 acres per 1,000 people wherever possible." Of the 33 neighborhoods analyzed, 10 were found to contain sufficient or excess parkland, the latter in the amount of 83.5 acres. The 23 remaining neighborhoods had parkland deficiencies. Of these, the City feels it is possible to bring six up to the desired standard. This would require the acquisition of 46.3 additional acres of parkland.

Parks in the Cheyenne Urban Area provide recreation facilities for baseball, softball, soccer, tennis, basketball, volleyball, and swimming. The city contains one 18-hole and one 9-hole golf course. In the absence of identified city standards, standards provided by the National Recreation and Parks Association and the Wyoming State Comprehensive Outdoor Recreation Plan indicate that Cheyenne is deficient by 18 tennis courts, 10 volleyball courts, 10 softball fields, and 1 baseball field. School facilities are excluded from this estimate since they are not available on a consistent basis.

The Parks and Recreation Department is staffed by 36 full-time persons assigned to 4 main divisions: recreation, parks, golf, and swimming. The number of part-time personnel varies by season. During the summer of 1983, 144 part-time staff members were employed by the

Department. Using current budget information, the full and part-time personnel figures were converted to a total equivalent of 83.5 full-time employees. Based on that figure, Cheyenne has a current ratio of 1.28 parks and recreation employees per 1,000 population.

#### 2.1.11.2.2.2 Kimball, Nebraska

The City of Kimball operates and maintains two parks within its boundaries. A number of service organizations also provide recreational programming and facilities. They include Kimball School District No. 1, the Senior Citizens Center, the public library, and commercial recreation operations.

The city has 2 parks totaling 21 acres, which include 2 basketball courts, 1 tennis court, and a swimming pool. Seven part-time employees maintain and operate Kimball's parks and recreation facilities. In addition, the City of Kimball and the County work cooperatively to operate and maintain the parks and recreation facility located southeast of Kimball on Highway 30. It contains four ballfields, two tennis courts, an archery and trap shooting range, and a nine-hole golf course. The facility is operated and maintained by two full-time and four part-time employees. Kimball has adequate parks and recreation facilities to accommodate its existing population.

#### 2.1.11.2.2.3 Wheatland, Wyoming

The Town of Wheatland owns and operates four parks within its incorporated limits. The Wheatland area contains a number of other recreational opportunities provided by public agencies and private enterprise. These include the Senior Citizens Center, Platte County School District No. 1, Black Mountain Recreation Center, and a limited number of commercial recreation facilities.

Wheatland has 4 parks totaling 33.7 acres; these contain an outdoor swimming pool, 4 tennis courts, 3 ballfields (2 lighted), and a combination volleyball/basketball court. The Parks Department operates these facilities and organizes recreation programs. Staff varies seasonally from five to nine employees, only two of whom are full time. In addition, Black Mountain Recreation Center provides recreation opportunities to the public for a fee. The center contains two tennis courts and an indoor pool. Wheatland has adequate facilities to accommodate its existing population.

#### 2.1.11.2.2.4 Pine Bluffs, Wyoming

The Town of Pine Bluffs owns and operates three parks within its boundaries. Maintenance of facilities and the organization of recreation programs are the responsibility of the Parks and Recreation Department.

Pine Bluffs has 3 parks totaling 8 acres, all of which have playground and picnic facilities. Pine Bluffs also operates and maintains a community center, swimming pool, and lighted ballfield. Staffing consists of eight employees, two of whom are full time. The part-time or seasonal employees have swimming pool or maintenance duties. In addition to these facilities, the Town and School District jointly operate and maintain three lighted tennis courts located on school property. Pine Bluffs has adequate parks and recreation facilities to accommodate its existing population.



2.1.11.2.2.5 Chugwater, Wyoming

Outdoor recreational facilities in Chugwater include a lighted baseball field with bleachers, a park with playground equipment and picnic tables, and a small rodeo arena southeast of town. The Chugwater General Store, a popular meeting spot, provides an informal facility for indoor activities.

## **2.1.12      Cultural and Paleontological Resources**

Cultural and paleontological resources include four major elements: prehistoric cultural resources, historic cultural resources, American Indian resources, and paleontological resources. These divisions recognize inherent physical differences among the elements and differences in the treatment and protection afforded to each under existing statutes, regulations, and guidelines.

Prehistoric cultural resources consist of those physical properties predating the advent of written records in a particular geographic region that are considered important to a culture, subculture, or community for scientific or humanistic reasons. These include geographical districts, structures, sites, objects, and other physical evidence of past human activity.

Historic cultural resources consist of those physical properties postdating the advent of written records in a given region that are considered important to a culture, subculture, or community for scientific or humanistic reasons. These include districts, structures, sites, objects, documents, and other physical evidence of past human activity.

American Indian cultural resources consist of locations, structures, biota, objects, and natural features of value to contemporary American Indians for traditional, religious, or ceremonial purposes. These resources include American Indian burials; contemporary sacred sites and areas; materials for production of sacred objects and traditional implements; and botanical, biological, and geological resources of ritual importance and their source locations.

Paleontological resources consist of physical remains of extinct life forms or others that may still have living representatives. These include fossilized remains of animals or plants or parts thereof, casts or molds of the same, or trace fossils such as impressions, burrows, and tracks. These typically occur in such contexts or localities as surface exposures, subsurface deposits exposed by ground-disturbing activities, and sites affording special environments for preservation (e.g., caves, peat bogs, and tar pits).

This section defines the region within which measurable impacts to cultural and paleontological resources might occur as a consequence of project deployment. It also summarizes existing baseline information relative to the four resource elements and reviews the information sources and analytic methods used in developing baseline resource characterizations.

The information in this section is based upon data and detailed analysis contained in the Cultural and Paleontological Resources Environmental Planning Technical Report.

### **2.1.12.1      Region of Influence, Data Sources, and Analytic Methods**

#### **2.1.12.1.1      Region of Influence**

The Region of Influence for cultural and paleontological resources encompasses Albany, Goshen, Laramie, and Platte counties, Wyoming; Banner, Kimball, and Scotts Bluff counties, Nebraska; and Larimer and Weld counties, Colorado (Figure 2.1.12-1). Delineation of this area is based on analysis of the kinds and locations of impacts anticipated as a consequence of project construction and peacetime operation. The Region of Influence encompasses sufficient geographic space to ensure that potentially important indirect, population-induced effects (e.g., altered land use and recreational patterns) are included within its boundaries. The identification of areas potentially subject to measurable population growth and related effects is based on projections of project-induced population growth.

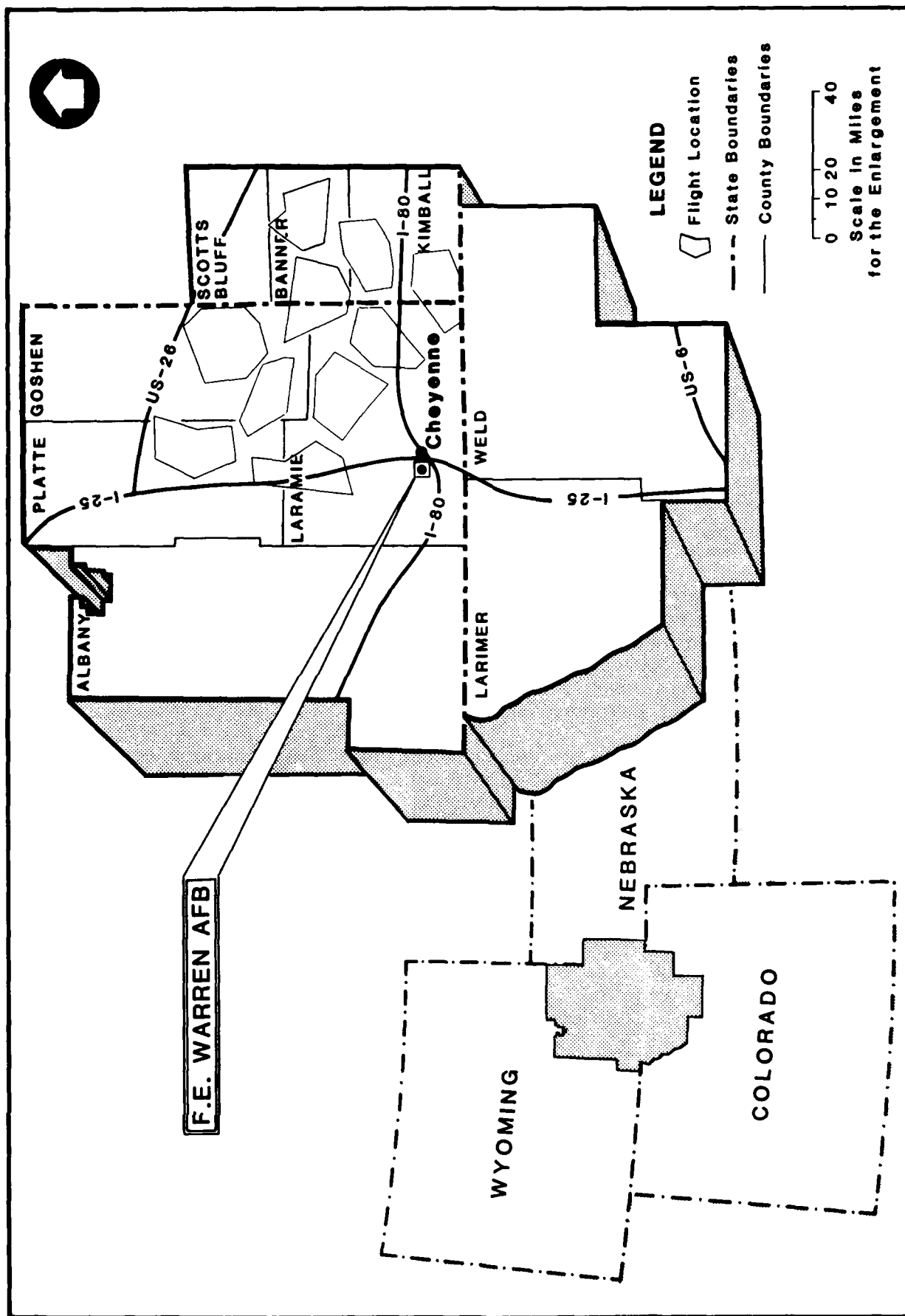


FIGURE 2.1.12-1 REGION OF INFLUENCE FOR CULTURAL AND PALEONTOLOGICAL RESOURCES

An Area of Concentrated Study requiring more detailed analyses of project impacts was recognized within the Region of Influence. The Area of Concentrated Study actually consists of a mosaic of relatively small, localized areas (e.g., the Launch Facilities and Operating Base) and corridors (e.g., transportation rights-of-way and buried cable paths) where direct project effects will take place (see Figures 1.6.2-1 to 1.6.2-4; 1.6.3-1 and 1.6.3-2). These areas are contained within Goshen, Laramie, and Platte counties, Wyoming; and Banner, Kimball, and Scotts Bluff counties, Nebraska. A more detailed discussion of the differences between the Area of Concentrated Study and Region of Influence is included in Section 3.1.12.1.

#### 2.1.12.1.2 Data Sources

Information important to the assessment of existing conditions, potential impacts, and future trends within the project Region of Influence and Area of Concentrated Study comes from a multitude of primary and secondary sources.

##### 2.1.12.1.2.1 Secondary Data Sources

Secondary data refers to those categories of information that are not the product of direct experience. In this study, the sources for such information are written and oral narratives.

Over 1,000 documents were reviewed during the course of this study, including statewide inventories, histories, reports of explorations, newspaper clippings, ethnographies, scientific treatises, archaeological site reports, and similar documents that required access to numerous libraries, archives, and repositories. A partial list of these facilities includes the Wyoming, Nebraska, and Colorado State Historic Preservation Offices; the Wyoming Division of Archives and History in Cheyenne; the Nebraska State Historical Society Archives in Lincoln; the Denver Public Library; the Coe Library at the University of Wyoming in Laramie; the University of Denver Library; the American Museum of Natural History in New York; the Peabody Museum at Harvard University; the U.S. National Museum in Washington DC; and the museums at the universities of Wyoming, Nebraska, and Colorado.

Perhaps the most important data sources among those listed above are the site inventory records and reports held by the State Historic Preservation Offices. Information contained within their files, which includes county-by-county listings and descriptions of all reported cultural resources, provides the basis for establishing current baseline characterizations and for assessing future trends in the resource with and without the project.

Interviews were conducted with knowledgeable professionals in both the academic and private sectors, amateur archaeologists and historians, and local landholders as a means of identifying possible resource localities not included in statewide inventories or other published sources. Contact also was made with several personnel at F.E. Warren AFB (e.g., the Base Civil Engineer, Real Property Officer, Base Historic Preservation Officer, and Base Historian) in order to collect information about the history of past military activity at this significant historical facility. Personal interviews were conducted with members of Indian groups having historical ties to the Region of Influence to identify sites of potential concern to contemporary practice of traditional religions and cultural activities. Several paleontologists having ongoing professional research interests in the Region of Influence were contacted to identify known and potential fossil localities in the area.

##### 2.1.12.1.2.2 Primary Data Sources

Primary data consist of those categories of information obtained as a consequence of direct experience. In the case of the current analysis, such information was gathered through onsite examination of selected areas within the Area of Concentrated Study in order to inventory and

evaluate cultural and paleontological resources subject to project impacts. These field investigations had three distinct foci: 1) historic architectural resources at F.E. Warren AFB, 2) archaeological resources at F.E. Warren AFB, and 3) archaeological and architectural resources in other areas of the project Deployment Area potentially subject to ground-disturbing activities.

Systematic onsite inventory and description of all standing structures located within the F.E. Warren AFB Historic District/National Historic Landmark, as well as select onbase structures outside the District/Landmark's boundaries, were undertaken to assess existing conditions and to make recommendations regarding adaptive reuse of structures for project missions. These investigations included exterior documentation and descriptions of nearly 300 individual structures, interior documentation and descriptions of 44 structures, and an examination of historic landscaping.

Systematic pedestrian reconnaissance was used to inventory archaeological and paleontological resources located within a series of proposed rights-of-way for onbase stage transporter routes. Similar inventory measures were used to examine the proposed Stage Storage Area and Weapons Storage Area facilities. Follow-on resource evaluation measures were undertaken at several sites recorded during resource inventory. These efforts included: 1) systematic surface collection to recover a representative sample of horizontal variability site; 2) shovel testing to establish the horizontal and vertical limits of the cultural deposits; and 3) limited-scale subsurface test excavation to establish preliminary estimates of stratigraphic and temporal variability at selected sites.

Systematic pedestrian reconnaissance and visual assessment measures were used to inventory archaeological and architectural resources in select portions of the Deployment Area. Surface reconnaissance techniques were employed around the perimeter fence at each of the 100 proposed project Launch Facilities. A visual inventory of historical structures in need of follow-on investigation was conducted both along all Defense Access Roads and within the Quantity Distance radius at all Launch Facilities.

#### 2.1.12.1.3 Analytic Methods

Analysis of information gained from literature research, personal interviews, and onsite reconnaissance inventory was undertaken to establish baseline existing conditions and to identify biases in the record that could affect later synthesis and interpretation. To a large degree, data processing and manipulation were similar for all constituent elements of the resource. All known sites and localities were first plotted onto standard topographic sheets to provide a common basis from which to assess resource dispersions. Records and reports pertaining to prehistoric cultural sites were reviewed to extract information about ages and types of sites, their geographic location, and surrounding environments. These data were keyed into a computer and the resultant data base used to develop summary accounts of existing conditions within the Region of Influence and to generate qualitative estimates for resources potentially subject to project impacts.

Information currently available from the statewide inventories and published accounts is vitally important to any understanding or appreciation of the region's cultural and paleontological record. Existing inventories, however, are the cumulative sum of more than 50 years of prior research in this area and thereby incorporate historical bias in the level of detail reported for any particular locality. In addition, each state has its own unique recording system. Nevertheless, for the overwhelming majority of recorded sites, relatively consistent data are available specifying geographic location and site type. In the case of prehistoric resources, the latter data category typically consists of a general descriptive term denoting resource context (e.g., rockshelter), structure (e.g., tipi ring), content (e.g., lithic scatter), or function (e.g., kill

site). In the case of historic cultural resources, the existing state inventories generally indicate whether a site is architectural or archaeological in nature but typically do not give finer distinctions. Paleontological localities have not been recorded consistently on statewide inventories, and information about these resources must be drawn from other sources.

Data gathered from primary onsite investigations of areas subject to direct impacts relate to both architectural and archaeological resources. For architectural resources (specifically, standing historic structures at F.E. Warren AFB), the data consist of exterior descriptions and photographic documentation of all onbase historic structures as well as interior documentation of all such structures subject to project modifications. Information concerning specific proposed project elements was compared to the baseline data in order to assess the degree to which individual historic structures would be altered by project-induced adaptive reuse.

Data recovered as a consequence of onsite archaeological inventory and evaluation of areas subject to direct project impacts consist of artifacts, contextual samples (e.g., soil and charcoal), and field records describing the conduct and progress of all investigations. Analyses of artifactual samples recovered from surface collections and subsurface testing are aimed at characterizing the functional, technological, and stylistic variability manifest in a given site assemblage. This information is crucial to determining a site's place in the indigenous settlement-subsistence system and to assessing site importance. Similarly, analyses of contextual samples recovered during onsite investigations are necessary to help establish the character of the depositional environment and its effect on cultural remains. Radiocarbon dating of charcoal samples extracted from a site's deposits provides essential information about the potential time-depth of site occupation or use. The results of these investigations were integrated into the current assessment effort to determine the nature and degree of impacts resulting from the Proposed Action.

#### 2.1.12.2 Existing Conditions

##### 2.1.12.2.1 Prehistoric Cultural Resources

##### 2.1.12.2.1.1 Summary of Known Resources

*Previous archaeological research in the Region of Influence demonstrates that the cultural inventory of the region spans approximately 11,000 years of human occupation, ranging from the Paleo-Indian through the Protohistoric periods (Figure 2.1.12-2). Included in the inventory of sites are several well-known, unique localities that have considerable importance to the archaeology of North America: the Hell Gap site in Wyoming, Signal Butte in Nebraska, and Lindenmeier site in Colorado. For example, the Dent site, also located in Colorado, provided the first concrete evidence establishing the contemporaneity of man and mammoth in the Western Hemisphere.*

A review of inventories maintained by the Colorado, Nebraska, and Wyoming State Historic Preservation Offices revealed that approximately 1,500 prehistoric archaeological sites and hundreds of additional isolated artifacts have been recorded within the Region of Influence. Table 2.1.12-1 provides a summary account of the number of recorded sites and their current status in terms of eligibility to the National Register for each of the nine counties included in the Region of Influence. Examination of data in this enumeration points up the high degree of variability among the counties. It is likely, however, that observed intercounty differences reflect variability in the extent of prior inventory work in these same areas rather than the actual densities of existing prehistoric sites; this same observation applies to the other resource elements as well.

Time (Years BP)	Frison (1978)	Mulloy (1958)	Wood (1967)	Carlson & Steinacher (1978)
0	Proto-historic	Late Prehistoric	Late Ceramic	Proto-historic
	Late Prehistoric		Middle Ceramic	Late Prehistoric
	Upper Republican		Early Ceramic	Upper Republican
	Plains Woodland	Late Middle Prehistoric	Late Preceramic	Plains Woodland
2000	Late Plains Archaic		Middle Preceramic	Late Middle Prehistoric Gering Mortuary Pelican Lake  McKean
	Besant			
	Pelican Lake			
	Middle Plains Archaic	Early Middle Prehistoric	Middle Preceramic	Archaic
	McKean			
	Mallory Points	Hiatus		Altithermal  (Oxbow) (Logan Creek)
4000	Duncan			
	Hanna			
	Yonkee	Early Prehistoric		Paleo-Indian
	Early Plains Archaic			
6000	Oxbow			
	Mt. Albion			
8000	Paleo-Indian			
	Lusk			
	Frederick			
	Cody			
	Plainview			
10,000	Firstview			
	Alberta			
	Hell Gap			
	Agate Basin			
	Midland			
	Folsom			
	Goshen			
	Clovis			
12,000				

FIGURE 2.1.12-2 PROPOSED PREHISTORIC CULTURAL CHRONOLOGIES  
FOR THE REGION OF INFLUENCE

Table 2.1.12-1

## RECORDED PREHISTORIC SITES IN THE REGION OF INFLUENCE

Location	Number of Sites	Status <sup>1</sup>				Examples of Known Sites
		R	E	D	N	
Wyoming						
Albany Co.	108	-	6	-	9	
Goshen Co.	52	-	10	-	11	Spanish Diggings; Hell Gap
Laramie Co.	89	-	7	-	14	Seven Mile Point
Platte Co.	142	-	9	-	18	Bowman Effigies
Nebraska						
Banner Co.	19	-	-	-	-	
Kimball Co.	1	-	-	-	-	
Scotts Bluff Co.	17	1	-	-	-	Gering Burial; Scotts Bluff Bison Quarry; Signal Butte; Bisterfeldt site
Colorado						
Larimer Co.	529	1	2	-	-	Lindenmeier; Lykins Valley site, Spring Gulch; Johnson site
Weld Co.	423	3	1	4	4	Dent site; Powars site; Keota District; Wilbur-Thomas

<sup>1</sup> R = On Register; E = Eligible; D = In District; N = Not Eligible.

Source: Wyoming, Nebraska, and Colorado State Historic Preservation Offices.



The known resource inventory includes a wide variety of site "types" that may reflect important differences in the kinds of cultural activities that took place during their occupation or use. These include open camps, stone circles and alignments, lithic and ceramic scatters, rockshelters, cairns, burials, quarries, kill sites, and pictographs/ petroglyphs. A tabulation of relative frequencies for the various recognized site categories exhibits consistency from county to county, suggesting that the observed frequency distribution may have considerable utility for regional scale characterizations.

Of the nearly 1,500 prehistoric sites currently recorded in the Region of Influence, only 5 are listed in the National Register, and an additional 35 are eligible for listing in the National Register. Although 56 sites have been officially designated as "not eligible," the overwhelming majority of sites have not been evaluated in terms of National Register criteria. None of the sites listed in the statewide inventories are located within the Area of Concentrated Study.

Resource inventories undertaken in support of project facilities siting efforts at F.E. Warren AFB during the summer and fall of 1983 resulted in the identification of 24 previously unrecorded prehistoric sites (Table 2.1.12-2) and 14 isolated artifact finds. Although evaluative efforts have yet to be completed at many of the sites located during inventory, preliminary results based on field observations at all resource loci and analyses of systematic surface collections and/or test excavation data at several sites suggest that many of these resources may be eligible for inclusion in the National Register (Table 2.1.12-2).

Onsite reconnaissance conducted at all 100 Launch Facilities included within the Proposed Action identified only 1 prehistoric site subject to direct project impacts. This site, which is classified as a lithic scatter, was largely destroyed as a consequence of the existing Minuteman Launch Facility but may contain sufficient intact cultural deposits to warrant further management consideration.

#### 2.1.12.2.1.2 Summary of Expected Resources

Based on the existing prehistoric data base for the Region of Influence and Area of Concentrated Study, it is expected that the relative percentages of site types for as yet unrecorded archaeological resources will be similar to those noted for known sites and that overall, sites will occur in considerable abundance throughout the Region of Influence and Area of Concentrated Study. Importantly, sites representing all recognized temporal divisions of the cultural record can be expected to occur.

The potential exists for finding prehistoric cultural remains throughout the Region of Influence and Area of Concentrated Study. Although available data do not provide a statistically reliable sample from which to generate quantitative estimates of the densities of resources occurring within the region, several general observations can be made on the basis of prior research in this same area. For example, the greatest densities can be expected to occur along watercourses and adjacent terraces as well as in areas of relative topographic and habitat diversity (e.g., bluff tops, breaks, badlands, and foothills); site densities in dry, short-grass uplands can be expected to be considerably lower. A recent survey in the western portions of Laramie County (Blatchley and Welty 1980), largely characterized by dry, short-grass uplands, found densities of approximately nine sites per square mile. Studies by Reher (1971, 1982), however, in areas of greater habitat diversity that includes watercourses and adjacent terraces, suggest that densities in some parts of the study area may range as high as 20 to 30 sites per square mile.

Table 2.1.12-2

## INVENTORY OF KNOWN PREHISTORIC ARCHAEOLOGICAL SITES AT F.E. WARREN AFB

Site Number <sup>1</sup>	Site Type	Time Period	Potential National Register Eligibility <sup>2</sup>
48-LA-241	Lithic scatter	Undeterm.	<u>Not eligible:</u> site lacks surface or subsurface integrity; redeposited by road construction
48-LA-244	Lithic scatter	Undeterm.	<u>Not eligible:</u> total inventory consists of two nondiagnostic artifacts in a disturbed context
48-LA-245	Lithic scatter	L. Archaic-L. Prehist.	<u>Eligible:</u> contains intact buried deposits and features; extensive data potential
48-LA-247	Lithic scatter	Undeterm.	<u>Undeterm.:</u> additional data required
48-LA-250	Lithic scatter	M. Archaic-L. Prehist.	<u>Not eligible:</u> deposits deflated/eroded; lacks surface and subsurface integrity
48-LA-251	Lithic scatter	Undeterm.	<u>Eligible:</u> appears to have intact subsurface deposits; additional data recovery required
48-LA-253	Subsurface bone and lithic debris scatter	Undeterm.	<u>Eligible:</u> appears to have intact subsurface deposits; additional data required
48-LA-259	Subsurface lithic scatter	L. Prehist.	<u>Eligible:</u> possibly contains intact subsurface deposits; surface assemblage includes two diagnostic artifacts
48-LA-260	Light scatter of prehistoric lithic debitage and historic artifacts	Undeterm.	<u>Eligible:</u> mixed prehistoric and historic deposits; additional data required
48-LA-262	Scatter of prehistoric lithic debitage and historic debris	Undeterm.	<u>Eligible:</u> mixed prehistoric and historic deposits; additional data required
48-LA-263	Light scatter of prehistoric lithic debitage and historic glass fragments	Undeterm.	<u>Eligible:</u> mixed prehistoric and historic deposits; additional data required
48-LA-264	Lithic scatter	Undeterm.	<u>Eligible:</u> partially disturbed; additional data required

Table 2.1.12-2 Continued, page 2 of 2  
INVENTORY OF KNOWN SITES

Site Number	Site Type	Time Period	Potential National Register Eligibility <sup>2</sup>
48-LA-265	Moderate lithic scatter; possible campsite	L. Prehist.	<u>Eligible</u> : possibly contains intact subsurface deposits; surface assemblage includes two diagnostic artifacts
48-LA-267	Very light lithic scatter	Undeterm.	<u>Not eligible</u> : site lacks surface or subsurface integrity; disturbed by road construction
48-LA-268	Light lithic scatter	Undeterm.	<u>Undeterm.</u> : possibly contains intact subsurface deposits, additional data required
48-LA-270	Very light lithic scatter	Undeterm.	<u>Not eligible</u> : highly disturbed context
48-LA-271	Light lithic scatter	E. Archaic(?)	<u>Undeterm.</u> : context appears highly disturbed; presence of unique diagnostic artifact; additional data required
48-LA-272	Very light lithic scatter	Undeterm.	<u>Eligible</u> : additional data required
48-LA-274	Very light lithic scatter	Undeterm.	<u>Undeterm.</u> : possibly disturbed; additional data required
48-LA-276	Very light lithic scatter	Undeterm.	<u>Not eligible</u> : surface inventory consists of 3 items; site context highly disturbed
48-LA-277	Lithic scatter with extensive subsurface deposit; 2 hearths	Undeterm.	<u>Eligible</u> : partially destroyed, but intact portions contain surface and subsurface deposits
48-LA-279	Diffuse lithic scatter	L. Archaic	<u>Eligible</u> : potential contains intact subsurface deposits; additional data required
48-LA-281	Light prehistoric lithic scatter and historic debris scatter	Undeterm.	<u>Eligible</u> : mixed prehistoric and historic deposits; additional data required
48-LA-450	Subsurface lithic scatter	Undeterm.	<u>Undeterm.</u> : represented solely by subsurface deposits; additional data required

<sup>1</sup> Site numbers are designated according to the Smithsonian Trinomial Numbering System: 48 = Wyoming; LA = Laramie County; and a series number corresponding to the numeration of sites within the County.

<sup>2</sup> Eligibility determinations are based on preliminary Air Force evaluations. Concurrence from the Wyoming State Historic Preservation Officer will be sought before final determinations are made.

## **2.1.12.2.2      Historic Cultural Resources**

### **2.1.12.2.2.1      Summary of Known Resources**

Cultural resource inventories maintained by the Wyoming, Nebraska, and Colorado State Historic Preservation Offices list over 1,100 historic sites within the Region of Influence and Area of Concentrated Study (Table 2.1.12-3 ). Sixty-eight of these are included in the National Register and an additional 136 are eligible for inclusion in the National Register; 7 sites are not eligible. Only one site listed in the statewide inventories, F.E. Warren AFB Historic District/Landmark (48-LA-71), occurs within the Area of Concentrated Study.

Known historic resources within the Region of Influence represent several themes pertinent to the history of the area, including mining (e.g., Gold Dust Mine in Albany County, Raw Hide Buttes Mining Area in Laramie County, Chicago Mine in Platte County) and transportation (e.g., the Overland, Oregon and Mormon trails, Denver to Fort Laramie Road). Evidence of early Euramerican exploration and settlement of the region appears as campsites, rock signatures, and graves found along historic trails and numerous abandoned homesteads and farmstead sites. The railroad era is represented by abandoned railroad beds and trestles and by standing structures such as the Colorado and Southern Railroad Depot in Larimer County and the Union Pacific Railroad Depot in Cheyenne. Other developments in the history of the region are represented by the Horse Creek Treaty Grounds in Scotts Bluff County, the Bay State Cattle Company in Laramie County, and the Larimer and Weld canals.

Many of the recorded resources are those with architectural qualities that are unique, representative of a particular period or style, or otherwise noteworthy. Cities such as Cheyenne, Greeley, and Fort Collins have designated Historic Districts (e.g., Cheyenne's Downtown Historic District, Greeley's 5th Street Neighborhood Area, Fort Collins' Old Town) containing structures dating to the late Victorian era or evidencing other important stylistic features. F.E. Warren AFB itself contains a designated Historic District/Landmark consisting of nearly 200 structures that date to the late nineteenth and early twentieth centuries, as well as associated landscaping and open spaces (Figure 2.1.12-3).

Individual structures or smaller groups of buildings within the Region of Influence also have been recognized as possessing architectural and/or historical importance. These include theatres (e.g., Park Theatre, Estes Park); railroad depots (e.g., Union Pacific Depot, Cheyenne; Loveland Depot, Loveland); schools (e.g., Whitecrest School, Laramie County; Lincoln School, Greeley); commercial buildings (e.g., Holly Sugar Factory, Torrington; 3M Fire Company, Kimball; Grier Furniture Company, Cheyenne); hotels (e.g., Wheat Growers Hotel, Kimball); government facilities (Fort Collins Post Office; Erie Town Hall, Erie, Colorado; Torrington Courthouse); homesteads (Touns Homestead, Laramie County; Walgren and Rutten Homestead Cabin, Estes Park, Colorado); agricultural structures (Rock Ranch, Goshen County; Stemmlor Ranch Barn, Goshen County; Coad Ranch, Laramie County); and churches (Epworth Church, Banner County; Saint Joseph's Church, Laramie County; Saint Matt's Cathedral, Albany County).

In addition to the physical evidence of past Euramerican exploration, settlement, and development, the historic cultural record bears witness to the continued occupation and use of the region by Native American groups during the Protohistoric and Historic periods. Nevertheless, the resource inventory contains relatively few recorded sites; a review of the Colorado, Nebraska, and Wyoming site inventory files found that only 15 loci have been assigned this cultural affiliation, and the majority of these are habitation sites.

Table 2.1.12-3

## RECORDED HISTORIC SITES IN THE REGION OF INFLUENCE

Location	Number of Sites	Status <sup>1</sup>				Examples of Known Sites
		R	E	D	N	
Wyoming						
Albany Co.	213	11	27	-	8	Overland Trail; Natural Fort; Gold Dust Mine; Lodgepole Creek Trail
Goshen Co.	137	5	12	-	6	Cheyenne-Ft. Laramie Rd.; Oregon Trail; Rawhide Buttes Mining Area; Mormon Trail
Laramie Co.	260	21	9	1	1	Denver-Ft. Laramie Rd.; Lodgepole Creek Trail; Bay State Cattle Co.; Texas Trail; Cheyenne; F.E. Warren Historic District/Landmark
Platte Co.	87	1	23	-	-	Oregon Trail; Chicago Mine; Mormon Mail Station Nebraska
Banner Co.	47	-	-	-	-	Historic House
Kimball Co.	36	-	-	-	-	
Scotts Bluff Co.	39	1	-	-	-	Fort Mitchell; Horse Creek Treaty Grounds; Robidoux Trading Post; Brown site
Colorado						
Larimer Co.	156	23	9	-	2	Larimer & Weld Canal; Overland Trail; Colorado and Southern RR Depot; Rocky Mountain Nat'l Park Historic District
Weld Co.	176	6	56	6	-	Larimer & Weld Canal; Ft. Vasquez; Overland; Dodge, Cherokee Trails; Greeley

<sup>1</sup> R = On Register; E = Eligible; D = In District; N = Not Eligible.

Source: Wyoming, Nebraska, and Colorado State Historic Preservation Offices.

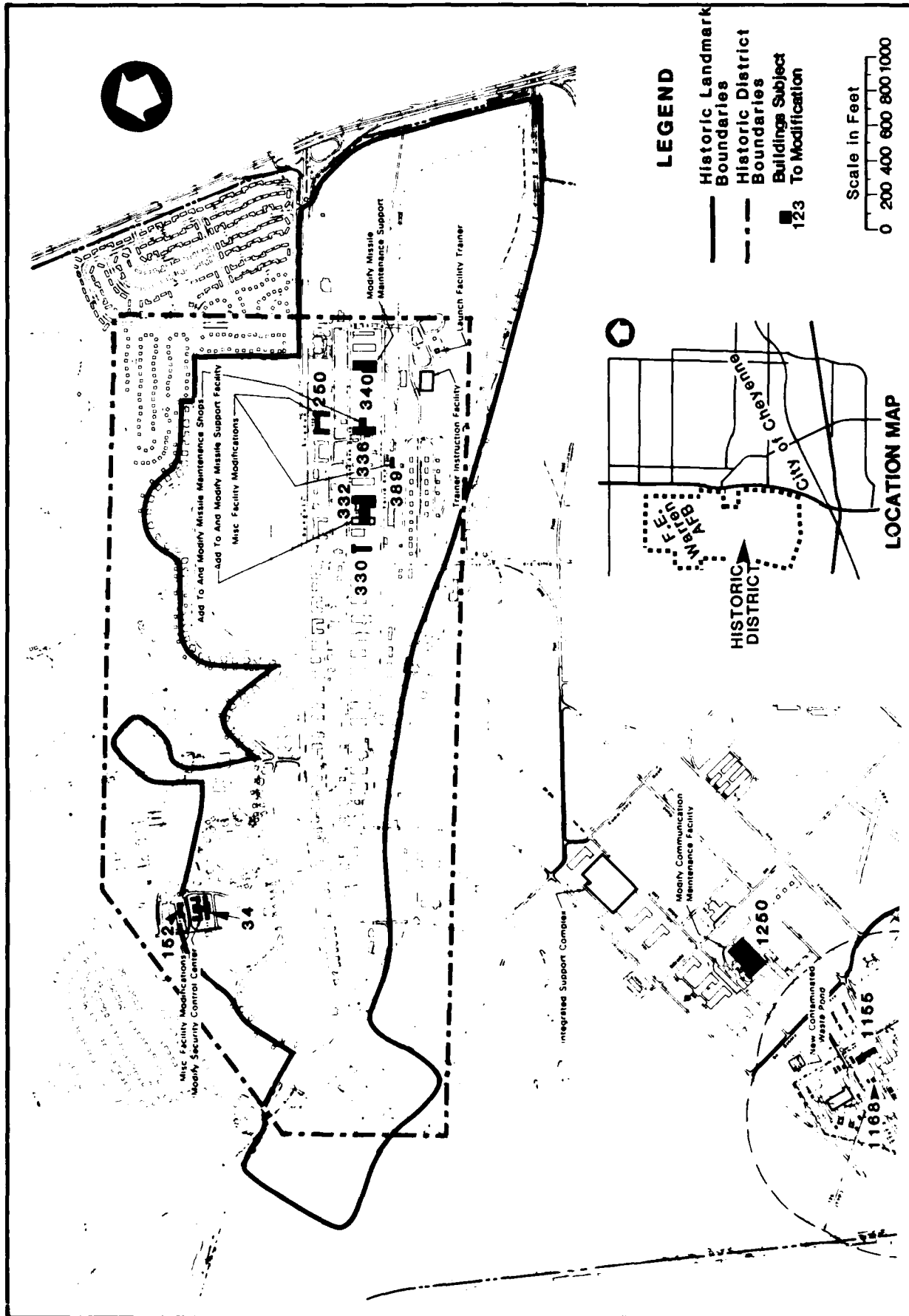


FIGURE 2.1.12-3 F.E. WARREN AFB HISTORIC DISTRICT / HISTORIC LANDMARK

Inventory of those portions of F.E. Warren AFB potentially subject to direct project impacts identified 29 previously unrecorded archaeological loci of historic Euramerican activity; no definite remains of historic American Indian occupation or use were found. Eleven of these consist of isolated artifacts and 18 exhibit sufficient cultural remains to warrant site designations (Table 2.1.12-4). Although several of the sites included within this inventory have been so altered by past land use activities that they no longer possess contextual integrity, the remaining sites have the potential for contributing to an understanding of the early military presence in the region and its role in the historical development of this region. For example, two of these newly recorded sites appear to date to the first military presence at Fort D.A. Russell (1867), and another site (48-LA-246) may be a refuse accumulation related to the U.S. Army's Cheyenne Depot (Camp Carlin) installation (1867).

In addition to archaeological sites, the historic cultural resource inventory includes several standing structures in the Area of Concentrated Study (Table 2.1.12-5). The nearly 200 buildings and associated landscaping and open spaces included within the F.E. Warren AFB Historic/National Landmark constitute the single most important collection of standing historical structures in the area, and several of these will be altered or removed as a result of emplacement of project functions and the displacement of certain onbase functions. Insofar as offbase resources are concerned, several structures of potential historic importance occur within the Quantity Distance zone around each Launch Facility. These sites typically are associated with the historical development of agriculture or ranching in the region and may provide important information about the evolution of the rural cultural landscape.

#### 2.1.12.2.2 Summary of Expected Resources

Based on results of archival and field research, the following types of historic archaeological and architectural resources may be expected to occur in the Region of Influence or Area of Concentrated Study:

- o Scattered remains of temporary camps associated with fur-trading activities;
- o Remnants of military-related activities, such as trails, camps, and skirmish sites;
- o Railroad-related sites, including construction camps, abandoned roadbeds, and trestles;
- o Overland emigrant trails and their associated telegraph, freight, and mail lines and camps;
- o Homesteads and farmsteads consisting of one or more of the following components:
  - multiple foundations;
  - outbuildings;
  - hand-dug wells or enlarged springs;
  - trash concentrations; and
  - privies or cisterns.
- o Extant buildings, including schools, churches, commercial and military structures, and residences; and
- o Remains of Protohistoric and Historic Native American occupation, such as campsites, tipi rings, kill sites, quarries, and other types of sites relating to indigenous settlement and subsistence activities.

Table 2.1.12-4

## INVENTORY OF KNOWN HISTORIC ARCHAEOLOGICAL SITES AT F.E. WARREN AFB

Site Number <sup>1</sup>	Site Type	Time Period	Potential National Register Eligibility <sup>2</sup>
48-LA-71 <sup>a</sup> (FEW 14)	Historic dump	1860-1920	<u>Undetermined</u> : contains intact stratified deposits and features dating to earlier use of Fort D.A. Russell; additional data needed
48-LA-71 <sup>a</sup> (FEW 24)	Historic artifact scatter	Undetermined	<u>Eligible</u> : appears to have intact subsurface deposits; additional data required
48-LA-71 <sup>a</sup> (FEW 62)	Building foundation remnant and historic debris	Undetermined	<u>Undetermined</u> : sites includes remnants of structures and associated historic debris; additional data required
48-LA-246	Historic dump; dates to 1941 (post dump) and earlier (possibly associated with Camp Carlin)	1860-1941	<u>Undetermined</u> : contains intact buried deposits possibly associated with Cheyenne Depot; additional data required
48-LA-248	Surface and subsurface historic artifact scatter	1900-1925	<u>Not eligible</u> : heavily disturbed by WWII bulldozer activity
48-LA-249	Historic trash scatter	1880-1930	<u>Not eligible</u> : artifacts occur in redeposited context; site lacks structural integrity
48-LA-260	Light scatter of prehistoric lithic debitage and historic artifacts	Undetermined	<u>Eligible</u> : mixed prehistoric and historic debris; additional data required
48-LA-261	Rocklined depressions with historic structural remains and historic artifacts	Undetermined	<u>Eligible</u> : site represented by two partially intact structural features; additional data required
48-LA-262	Scatter of prehistoric lithic artifacts and historic debris	Undetermined	<u>Eligible</u> : mixed prehistoric and historic debris; additional data required
48-LA-263	Light scatter of prehistoric lithics and historic glass fragments	Undetermined	<u>Eligible</u> : mixed prehistoric and historic debris; additional data required



Table 2.1.12-4 Continued, page 2 of 2  
F.E. WARREN AFB HISTORIC SITE INVENTORY

Site Number	Site Type	Time Period	Potential National Register Eligibility <sup>2</sup>
48-LA-266	Moderately heavy scatter of historic debris/dump; may be associated with D.A. Russell laundress quarters	Undetermined	<u>Eligible</u> : additional data required
48-LA-269	Historic dump; contains remnant of structural feature	Undetermined	<u>Not eligible</u> : site is a mixture of historic and recent debris in a highly disturbed context; possible historic firing range location
48-LA-273	Historic debris scatter/dump	Undetermined	<u>Eligible</u> : site is an extensive dump possibly dating to 1920-1930 or earlier; additional data required
48-LA-275	Historic dump	Undetermined	<u>Undetermined</u> : site integrity in question; potentially dates from WWII era; additional data required
48-LA-278	Subsurface scatter of bone and historic debris; possible association with Camp Carlin (1867)	Undetermined	<u>Eligible</u> : contains intact subsurface deposits and at least one buried feature; additional data required
48-LA-280	Historic dump; military residential area and associated refuse; structural features present	1860-1930	<u>Eligible</u> : major portion of site appears intact and contains assemblage reflecting wide range of activities; additional data required
48-LA-281	Light prehistoric lithic scatter and historic debris scatter	Undetermined	<u>Eligible</u> : mixed prehistoric and historic debris; additional data required
48-LA-282	Subsurface scatter of historic debris	Undetermined	<u>Undetermined</u> : disturbed context; additional data required

- <sup>1</sup> Site numbers are designated according to the Smithsonian Trinomial Numbering System: 48 = Wyoming; LA = Laramie County; and a series number corresponding to the numeration of sites within the County.
- <sup>2</sup> Eligibility determinations are based on preliminary Air Force evaluations. Concurrence from the Wyoming State Historic Preservation Officer will be sought before final determinations are made.
- <sup>a</sup> This site partially lies within the Historic District/Landmark and was assigned the Landmark's site number by the Wyoming State Historic Preservation Office.

Table 2.1.12-5

INVENTORY OF STRUCTURES POTENTIALLY  
AFFECTED BY THE PROPOSED ACTION

Resource Description	Location	Original Function & Construction Date	National Register Status/Eligibility	Present Use	Historic Integrity
Bldg. 34	F.E. Warren AFB	Hospital 1909-1911	Historic District/ National Landmark	Security police headquarters	Long-term minor modifications of original exterior & basement due to modernization, but roof-line & structure mostly intact & original fabric & appearance retained; interior has been altered by modular office construction & drop ceilings, but few permanent modifications & still largely intact
Bldg. 152	F.E. Warren AFB	Medical Corps barracks 1938	Historic District/ National Landmark	Temporary dormitory	Substantially intact exterior; doors (inside) replaced but original interior features largely present and intact
Bldg. 250	F.E. Warren AFB	Artillery barracks 1909	Historic District/ National Landmark	Wing Headquarters	Substantial alteration of original exterior by removal of original front & rear porches, replacement of windows, & addition of stairwell; 1st story interior converted to office space with modular construction but original fabric intact; 2nd story unused at present & largely intact
Bldg. 330	F.E. Warren AFB	Artillery band stable 1909	Historic District/ National Landmark	Housing; Vacant	Original exterior & interior substantially intact
Bldg. 332	F.E. Warren AFB	Artillery stable 1909	Historic District/ National Landmark	Missile vehicle & equipment control; field-team administration; security; missile guidance control system	Substantial post-1940 incompatible addition to & modification of original exterior & building plan but much of original fabric intact; interior steel support structure added to original building
Bldg. 336	F.E. Warren AFB	Artillery stable 1909	Historic District/ National Landmark	Special vehicle & missile maintenance shops	Substantial post-1940 incompatible addition to & modification of original exterior & building plan but much of original fabric intact; interior paneling & drop ceiling added but basic fabric intact
Bldg. 340	F.E. Warren AFB	Artillery stable 1909-1911	Historic District/ National Landmark	Electronics laboratory and maintenance training	Roof, windows, & west wall substantially altered by post-1940 addition, but portions of original wall intact; interior fabric basically intact with addition of paneling & drop ceilings

Table 2.1.12-5 Continued page 2 of 2  
INVENTORY OF STRUCTURES

Resource Description	Location	Original Function & Construction Date	National Register Status/Eligibility	Present Use	Historic Integrity
Bldg. 389	F.E. Warren AFB	Artillery commissary & ordnance storehouse 1910	Historic District/ National Landmark	Vacant	Original exterior & interior fabric intact, including most of original fixtures, but presently undergoing remodeling
Bldgs. 801-806	F.E. Warren AFB	WWII motor vehicle maintenance facilities 1941	Eligible	Warehouse & storage with office space	Modified by addition soon after original construction; original exterior finish deteriorated & replaced; extensive interior reconfiguration (partitions, drop ceilings) but general plan remains
Bldg. 1250	F.E. Warren AFB	WWII Communications facility	Undetermined	Communications facility and helicopter hangar	Interior reported to have been modified extensively in 1960, but exterior appears to be substantially intact
House & Associated Stable (258N9)	Launch Facility C-11; Banner County, Nebraska; on private property	Undetermined	Undetermined	Agriculture; unoccupied	No standing structures exist but possible archaeological materials in subsurface deposits
Square one-story log (?) house & associated out-building	Launch Facility A-8; Laramie County, Wyoming; on private property	Undetermined pre-1900 (?)	Undetermined for both structures	Undetermined for both structures; unoccupied	From visual inspection, original exterior appears to be intact; interior not inventoried
Small rectangular house, grain storage facilities, sheds, & a barn	Launch Facility C-7; Banner County, Nebraska; on private property	Farm complex; undetermined date	Undetermined for all structures; potential architectural values	Agricultural; occupied	Unable to determine condition by visual inspection
One-story frame house; frame barn & shed, 6 Quonset huts & other structures	Launch Facility C-7; Banner County, Nebraska; on private property	Farm complex pre-1925 (?)	Undetermined for all structures except Quonset huts, which are not eligible	Agricultural; probably occupied	Unable to determine condition by visual inspection
One-story frame house with small frame barn, 2 frame sheds, 1 metal silo, & small concrete building	Launch Facility E-10; Laramie County, Wyoming; on private property	Farming complex; undetermined date	Undetermined	Agricultural	Intact

Given the number of currently recorded sites and the limited extent of prior resource inventory within the Region of Influence, it is expected that large numbers of Protohistoric and Historic cultural sites still remain to be recorded.

#### 2.1.12.2.3 American Indian Cultural Resources

##### 2.1.12.2.3.1 Summary of Known Resources

Several American Indian groups are believed or known to have occupied, used, or passed through the Region of Influence and Area of Concentrated Study during the Protohistoric and Historic periods. These groups include the Cheyenne, Shoshone, Comanche, Crow, Plains Apache, Kiowa, Arapaho, and Sioux. The Fort Laramie Treaty of 1851 assigned the area between the North Platte and Arkansas rivers east of the Continental Divide, which includes virtually all of the area encompassed by the Region of Influence, to the Cheyenne and Arapaho jointly. Based upon their historic occupation of the area, interviews were conducted with representatives of both tribes to identify any locations of current or traditional cultural use. None of those interviewed were aware of any burials or "holy" places within the Area of Concentrated Study.

As noted in Section 2.1.12.2.2.1, several American Indian sites dating to the Protohistoric and Historic periods are included in current resource inventories maintained by the Wyoming, Nebraska, and Colorado State Historic Preservation Offices. The overwhelming majority of these sites, however, are habitation loci and are therefore considered as a component of the historic cultural resources element. Those sites included in these inventories that are not habitation loci have not been attributed to any particular tribal group.

##### 2.1.12.2.3.2 Summary of Expected Resources

American Indian cultural resources that may occur in the Region of Influence and Area of Concentrated Study would include cultural phenomena such as stone circles and burial locations; natural and biological resources could include minerals and plants important in medicines and ceremonies. The likelihood of encountering such resource localities in the Area of Concentrated Study is assessed as low.

#### 2.1.12.2.4 Paleontological Resources

##### 2.1.12.2.4.1 Summary of Known Resources

Quaternary, Tertiary, and Cretaceous geologic units are the most fossiliferous in the Region of Influence and Area of Concentrated Study and have the widest areal distribution. Older geologic units locally contain fossiliferous zones but have limited areal extent within the Region of Influence. Most exposures of pre-Tertiary units are found flanking the Laramie Mountains and Colorado Front Range. Of the fossil localities currently included in known resource inventories, no such instances occur within the Area of Concentrated Study.

Alluvial sediments are the source for most Quaternary mammalian fauna found in the Region of Influence. The majority of data relating to Quaternary fauna are concentrated in Late Pleistocene and Holocene sediments.

The dominant fossil-producing Tertiary geologic units include the Ogallala (Miocene/Pliocene), Arikaree (Miocene), White River (Oligocene), and the Wind River (Eocene). Tertiary geologic units crop out over the majority of the Region of Influence. In general, the White River Group is considered highly productive, while the Arikaree Group and Ogallala

Formation are considered low and moderate in productivity, respectively. The overall faunal assemblages are similar for each geologic unit at the higher taxonomic levels; however, they differ considerably at the species level.

The dominant Mesozoic geologic units include the Laramie (Upper Cretaceous) and Morrison (Lower Cretaceous–Upper Jurassic). Extensive exposures of the Laramie Formation are found in Weld County. Recent investigations in Weld County have found rare, but productive localities that increase the paleontological importance of this unit. Recorded localities in the Morrison Formation in Albany County have provided significant fauna. Mammalian assemblages are the most taxonomically diverse known from Mesozoic sediments.

#### 2.1.12.2.4.2 Summary Of Expected Resources

Based on the review of literature and locality records, it can be expected that additional paleontological localities will be found within the Region of Influence. Localities in the Ogallala Formation, Arikaree, or White River groups could contain representatives of all major vertebrate orders. In general, fossils will most likely be exposed in areas with a component of natural or manmade topographic relief: bluffs, escarpments, arroyos, and any heavily dissected terrain. Fossil resources are likely to be localized in the Ogallala Formation due to the correlation between Tertiary-age point bar deposits and paleontological localities. Because of the productive nature of the White River Group, nearly any exposure, natural or manmade, is likely to contain fossils.

Although deposits representing these fossil-bearing formations occur within the Area of Concentrated Study, the likelihood of encountering localities of potential scientific importance in direct impact areas is remote. This conclusion is based on several factors: the lack of previously reported localities in these areas, the sparse and unpredictable dispersion of scientifically important fossil sources, and the shallow nature of most project-related ground disturbances.

### **2.1.13      Visual Resources**

An assessment was conducted to identify, map, and evaluate the scenic resources and visual quality of the region.

The information in this section is based upon data and detailed analysis contained in the Land Use Environmental Planning Technical Report.

#### **2.1.13.1      Region of Influence, Data Sources, and Analytic Methods**

##### **2.1.13.1.1      Region of Influence**

The Region of Influence for visual resources coincides with that for land use (Figure 2.1.10-1). These six counties contain the Deployment Area, F.E. Warren AFB, and those urban communities in which the majority of population influx will occur. The Area of Concentrated Study is synonymous with the Region of Influence because direct impacts will be concentrated at F.E. Warren AFB and the Deployment Area.

##### **2.1.13.1.2      Data Sources and Analytic Methods**

###### **2.1.13.1.2.1      Data Sources**

Primary data for the visual resources assessment were derived from field surveys conducted from major transportation routes and interconnecting state and county roads throughout the six-county Region of Influence.

Literature sources for the visual resources analysis included publications developed by the U.S. Bureau of Land Management (BLM), the U.S. Forest Service, and private corporations and consultants in support of visual analysis systems for both open rangeland and forestland.

###### **2.1.13.1.2.2      Analytic Methods**

To assess the scenic resources and quality of the visual environment within the Region of Influence, a modified version of the BLM Visual Resource Management Program was used.

The Visual Resource Management system is an analytical process that identifies and sets objectives for the maintenance of scenic value and visual quality. The system is based on research that has established ways to assess the aesthetic qualities of a landscape in objective terms. The Visual Resource Management system contains three major components which include inventory/evaluation, visual resource management classification, and contrast rating. The first two components are used to describe and classify the existing visual setting. The third component, contrast rating, is a technique for assessing the impact of a proposed change in the landscape due to project activities and, as such, is addressed in Section 3.1.13.4.

The inventory/evaluation process consists of scenic quality assessment, use volume determination, and designation of viewing distance zones. Scenic quality assessment assigns a point system that rates the importance of specific landscape components, calculates values, and determines an overall scenic quality class rating for various landscape segments. This step identifies areas that warrant protection and opportunities for improvement.

Use volume examines the frequency of travel along major transportation routes and visitor days at recreational areas, and assigns a high, medium, or low rating. Viewing distance zones are field-determined.

Visual Resource Management Class designations are derived from an overlay process that combines the scenic quality, use volume, and viewing distance zones inventory/evaluation results to identify areas with a similar combination of factors. These management classifications serve as an overall index to visual resource values and describe guidelines for acceptable levels of modification to the basic elements of the landscape. The classifications range from unique areas, such as wilderness or wild and scenic rivers where few man-induced activities are acceptable (Class I), to areas where the natural character of the landscape has been disturbed to the point where rehabilitation is necessary (Class V).

#### **2.1.13.2      Existing Conditions**

##### **2.1.13.2.1 Project Area Description**

###### **2.1.13.2.1.1 Natural Features**

The landscape of the region is widely varied. The majority of the area consists of treeless, semiarid lands of relatively flat to gently or moderately rolling terrain. In most of Laramie and Kimball counties, the landform is generally flat to gently rolling, with agriculture serving as the primary land use. The landscape of Goshen County consists of low rolling hills intermixed with steep buttes and mesas in the south and highly dissected, strongly rolling mountains in portions of the north.

Along the extreme western edge of Laramie and Platte counties, the foothills of the Laramie Mountain Range rise to the highest elevations within the Region of Influence. They are exemplified by rugged, strongly dissected sloping mountains containing a variety of landforms. Vegetation varies from rangeland species throughout most of the region to aspen and pine forest in the higher elevations. In the northeastern edge of the Region of Influence, Scotts Bluff and Banner counties, prominent rock outcrops and cliffs of high vertical relief rise to the south of the broad agricultural valley of the North Platte River.

###### **2.1.13.2.1.2 Manmade Features**

Ranching activities throughout the Region of Influence have given the landscape an overall pastoral setting. The use of the landscape varies but is primarily devoted to agricultural land uses, including irrigated and dry-farmed cropland and open rangeland.

Larger residential communities within the Region of Influence include Cheyenne, Wheatland, and Torrington in Wyoming, and Scottsbluff, Gering, and Kimball in Nebraska. F.E. Warren AFB, located directly west of Cheyenne, has grown from an historic fort to a strategic base with all of the requisite support facilities.

Industrial activity within Laramie and Platte counties has created intrusions which reduce the visual quality of the immediate surrounding area. Visual intrusions are defined as man-caused alterations that introduce discontinuity. Within Cheyenne, the Husky Oil Refinery changes the southeast section of town into an industrial setting which transcends the residential character of the landscape. In central Platte County, the Laramie River Power Station of the Missouri Basin Power Project dominates the local landscape.

## 2.1.13.2.2 Visual Resource Management System

### 2.1.13.2.2.1 Scenic Quality Inventory/Evaluation

Scenic quality is the overall impression retained after driving or walking through or flying over an area of land. The Region of Influence was divided into separate landscape segments which were evaluated for landform, vegetative, and water variety. Each area was then rated by the factors of landform, vegetation, water, color, influence of adjacent scenery, scarcity, and cultural modification. A standardized point system assigned importance to each factor. The values for each category were totaled and, according to points, three scenic quality class designations were derived. Scenic quality classes according to the BLM are Class A, which combines the most outstanding characteristics of each rating feature; Class B, which combines some outstanding features and some that are fairly common to the physiographic region; and Class C, which contains features fairly common to the region.

All three scenic quality classifications are found within the Region of Influence. Most of the land in the southern half of the Region of Influence falls within a Scenic Class C designation. The northern and extreme western portions combine all three classifications. Most of Scotts Bluff County and the northern half of Banner County are Scenic Class B. Scotts Bluff National Monument, located directly south of the city of Scottsbluff, is Scenic Class A. In the western portion of the Region of Influence, where the foothills of the Laramie Mountains rise from the high plains, all three classifications occur.

### 2.1.13.2.2.2 Visual Resource Management Classification

Visual Resource Management class designations are derived by combining scenic quality and use volume overlays with distance zone inventory information. This process produces a map which outlines areas with a similar combination of inventory/evaluation elements. By using the Visual Resource Management Class Matrix reproduced in this paragraph (Figure 2.1.13-1), class designations are determined.

		USE VOLUME						
		high			medium		low	
SCENIC QUALITY	special areas	I	I	I	I	I	I	I
	A	II	II	II	II	II	II	II
	B	II	III	IV	III	IV	IV	IV
	C	III	IV	IV	IV	IV	IV	IV
DISTANCE ZONES		fg-mg	bg	ss	fg-mg	bg	ss	ss

FIGURE 2.1.13-1

As an example, areas deemed Scenic Quality Class A, or Scenic Quality Class B areas combined with high use volume and foreground/middleground distance zones, result in a Visual Resource Management Class II designation. Three of the five management classes occur within the Region of Influence - Visual Resource Management Classes II, III, and IV. These are shown in Figure 2.1.13-2.



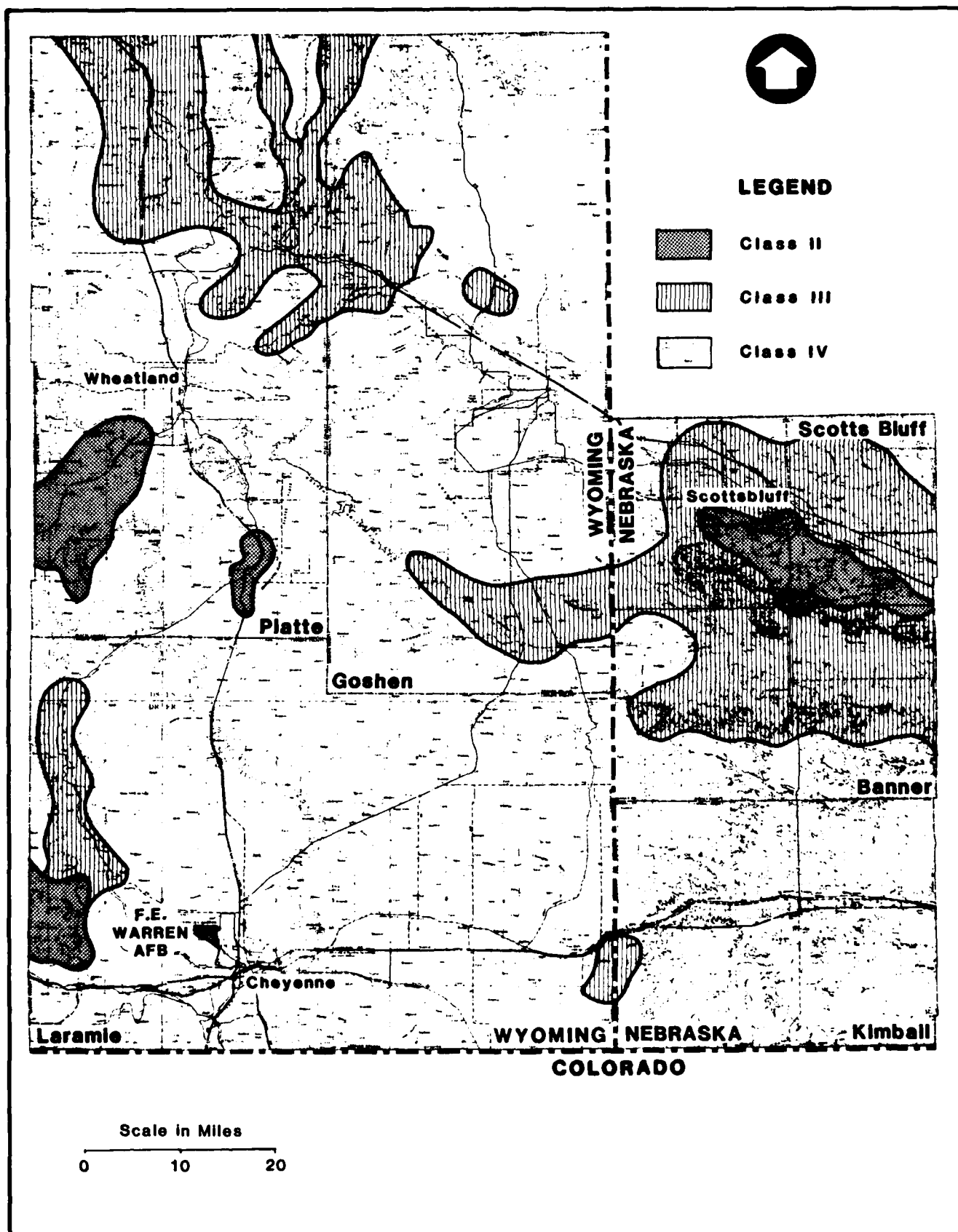


FIGURE 2.1.13-2 VISUAL RESOURCE MANAGEMENT CLASSES

## **2.2      Natural Resources**

### **2.2.1      Water Resources**

Water resources consist of groundwater and surface water. This analysis considers man's use of those resources, and man's control of that use as it affects water quantity and quality. The analysis is divided into four elements. The water use and demand element addresses municipal, industrial, commercial, and agricultural water use and water supply sources. The constraints on water use element addresses water rights, other controls on water use, and laws and regulations that protect water quality. The surface water hydrology and quality element addresses streams, lakes, and reservoirs and their flow characteristics and water quality conditions. The groundwater hydrology and quality element addresses aquifers, recharge to and discharge from them, and water quality conditions in the aquifers.

The information in this section is based upon data and detailed analysis contained in the Water Resources Environmental Planning Technical Report.

#### **2.2.1.1      Region of Influence, Data Sources, and Analytic Methods**

##### **2.2.1.1.1      Region of Influence**

The Region of Influence includes all locations where additional water will have to be provided to serve the direct and indirect project-induced population or land use changes arising from project construction. Watershed boundaries were superimposed over direct project sites and the employment demand Region of Influence to form the outermost water resources Region of Influence. The Region of Influence is shown in Figure 2.2.1-1.

The water resources analysis was conducted in several Areas of Concentrated Study within the overall water resources Region of Influence. The Areas of Concentrated Study include all locations where potentially significant impacts could occur and includes areas around Launch Facilities, Launch Control Facilities, cables, and Defense Access Roads in the Deployment Area and in municipalities where induced population is allocated by the socioeconomic model. For a more detailed justification of the Areas of Concentrated Study, see Section 3.2.1.1.

The Areas of Concentrated Study for water demand and water use include the Crow Creek watershed upstream of Carpenter, Wyoming, and portions of Banner, Kimball, and Scotts Bluff counties, Nebraska, and Laramie, Platte, and Goshen counties, Wyoming.

The Areas of Concentrated Study for constraints on water use include Nebraska and Wyoming requirements and constraints relative to water use and water quality that apply in the Region of Influence.

The Areas of Concentrated Study for surface water hydrology and quality include the Crow Creek watershed upstream of Carpenter and the Lodgepole, Horse, Pumpkin, and Chugwater Creek watersheds.

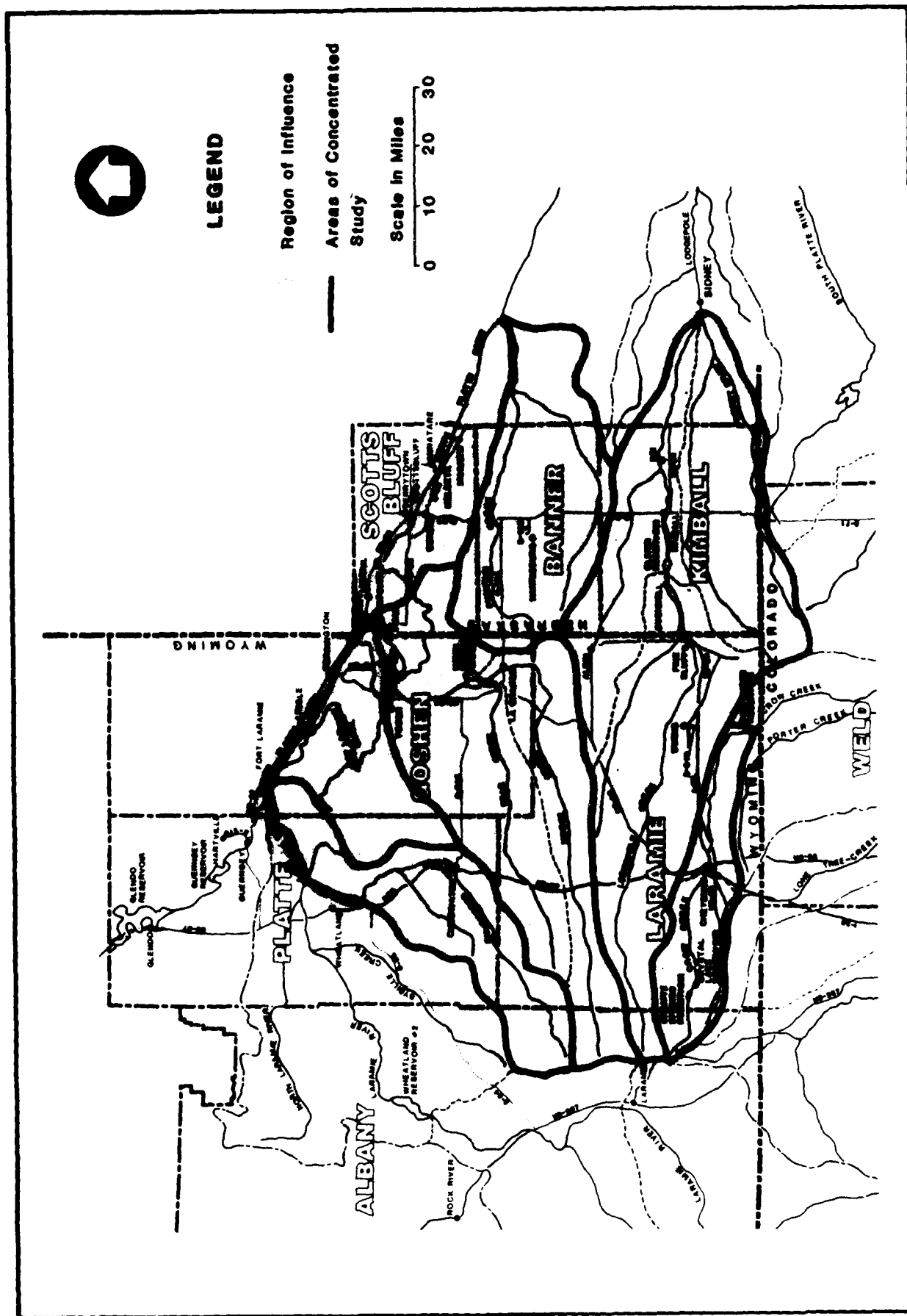


FIGURE 2.2.1-1 REGION OF INFLUENCE FOR WATER RESOURCES

The Areas of Concentrated Study for groundwater hydrology and quality include the Crow Creek watershed area upstream of Carpenter and areas in the vicinity of municipal wells and wells, if any, developed for project construction.

#### **2.2.1.1.2      Data Sources**

Data sources for the water resource analysis included literature, group and agency contacts, and primary data collection. Several meetings were held in the Region of Influence to collect data or review proposed analytical methodologies. These included meetings with staff of the Wyoming State Engineer's Office, Wyoming Department of Environmental Quality, Wyoming Water Research Center, Wyoming Water Development Commission, Nebraska Conservation and Survey Division, Nebraska Department of Water Resources, Nebraska Department of Health, Nebraska Department of Environmental Control, U.S. Geological Survey (USGS), U.S. Environmental Protection Agency (EPA), U.S. Forest Service, Soil Conservation Service (SCS), F.E. Warren AFB, Cheyenne Board of Public Utilities, and municipal officials. These agencies supplied literature and data to describe existing conditions and future trends in the Areas of Concentrated Study. The public scoping process provided additional opportunities to comment on data base availability and applicability of proposed analysis methodologies.

A separate water acquisition program for the project is being developed in conjunction with the Nebraska Department of Water Resources, Wyoming State Engineer's Office, and Cheyenne Board of Public Utilities that describes methods and procedures to acquire water for project construction and operation (Ertec 1983). Data collected as part of that analysis were used for the water resources analysis.

Primary data were collected in the Crow Creek watershed Area of Concentrated Study to evaluate water supply capability, stormwater effects, and the Cheyenne Board of Public Utilities raw water delivery system operation.

#### **2.2.1.1.3      Analytic Methods**

Existing water use patterns and the capability of water supply sources were summarized based on existing data and water development plans and programs. Unit water demand factors (i.e., gallons per capita per day [gpcd]) were calculated. The existing water supply potential of the Crow Creek watershed Area of Concentrated Study was calculated based on precipitation/runoff relationships.

Existing legal restrictions related to water quality and the process for obtaining water rights were reviewed and summarized for Wyoming and Nebraska.

Existing surface water flow and quality records, and the impact of existing wastewater discharge were summarized for the Areas of Concentrated Study based on literature sources. Existing flood potential was calculated for the Crow Creek watershed Area of Concentrated Study using SCS and EPA methods (SCS 1975, EPA 1982), and checked against methods used in the area (Lowham 1976). Drainage areas of the various Area of Concentrated Study watersheds were calculated and a gross assessment of existing erosion and sedimentation potential from current land uses was made assuming typical erosion rates (Fly et al. 1982).

Existing groundwater flow patterns, regional aquifer characteristics, and water quality data were summarized for the Crow Creek watershed Area of Concentrated Study (Crist 1980) and other Areas of Concentrated Study based on literature sources.

### 2.2.1.2 Existing Conditions

This section describes the water resources of the areas potentially affected by the proposed project.

#### 2.2.1.2.1 Water Demand and Water Use

##### 2.2.1.2.1.1 Crow Creek Watershed

Current water use in the Crow Creek watershed Area of Concentrated Study is estimated at about 32,000 acre feet per year (acre-ft/yr) with about one-half used for agricultural purposes. Water use in the Cheyenne Urban Area is about 14,000 acre-ft/yr, with about 93 percent supplied by the Cheyenne Board of Public Utilities. Nonindustrial municipal use in the Cheyenne Board of Public Utilities service area averaged 180 gpcd in 1980. Municipally supplied industrial water use was 2,200 acre-ft in 1980. F.E. Warren AFB was supplied 1,070 acre-ft by the Cheyenne Board of Public Utilities in 1980.

Water supply availability to the Cheyenne Board of Public Utilities includes Crow Creek drainage, municipal wellfields, and imports to the area from Douglas Creek through the Cheyenne Stage I facilities. Figure 2.2.1-2 is a schematic of the average supply from each of these sources for the period 1976 to 1982. Cheyenne Stage II facilities presently under construction will provide a potential Douglas Creek diversion of up to 12,400 acre-ft/yr by 1986. Capacity of the system is limited by the pipeline capacity from Lake Owen to Middle Crow Creek. Construction of a second pipeline would allow full supply of 23,000 acre-ft/yr from Cheyenne Stage I and II facilities (U.S. Department of Agriculture 1981). Figure 2.2.1-3 provides a schematic of the water resource system for the Cheyenne Urban Area as it will exist after initial Stage II construction.

Water development planning for the Crow Creek watershed has included consideration of upgrading reservoirs and constructing new facilities (Banner 1983), water conservation programs, and reducing reliance on municipal wellfields.

The total inflow from Crow Creek above current diversion facilities is estimated at 9,000 acre-ft/yr of which 4,600 acre-ft/yr is currently used with the remainder evaporating, bypassing diversion points, or spilling over dams at diversion facilities. Spillage and bypass help to recharge the groundwater basin from which municipal wells obtain their supply. It is estimated that a 1 in 10-year drought would reduce the yield from the Crow Creek watershed to about 3,700 acre-ft/yr.

A variety of water conservation programs have been proposed in the Area of Concentrated Study. They include measures to reduce outdoor irrigation use, meter all users, adopt accelerated rate schedules, and encourage use of water saving devices (Cheyenne Water Conservation Advisory Group 1982). A plan to reuse wastewater to irrigate the F.E. Warren AFB golf course has also been proposed (Baker, Sweeney and Associates 1981).

Although the production from the wellfields has ranged from 1,600 to 8,400 acre-ft/yr in recent years, a goal of using 2,000 acre-ft/yr for municipal supply from the Cheyenne wellfields has been established (Cheyenne Board of Public Utilities 1983). The true production capability of the wellfields is unknown, but a program has been established to better define this capability (Ertec 1983).

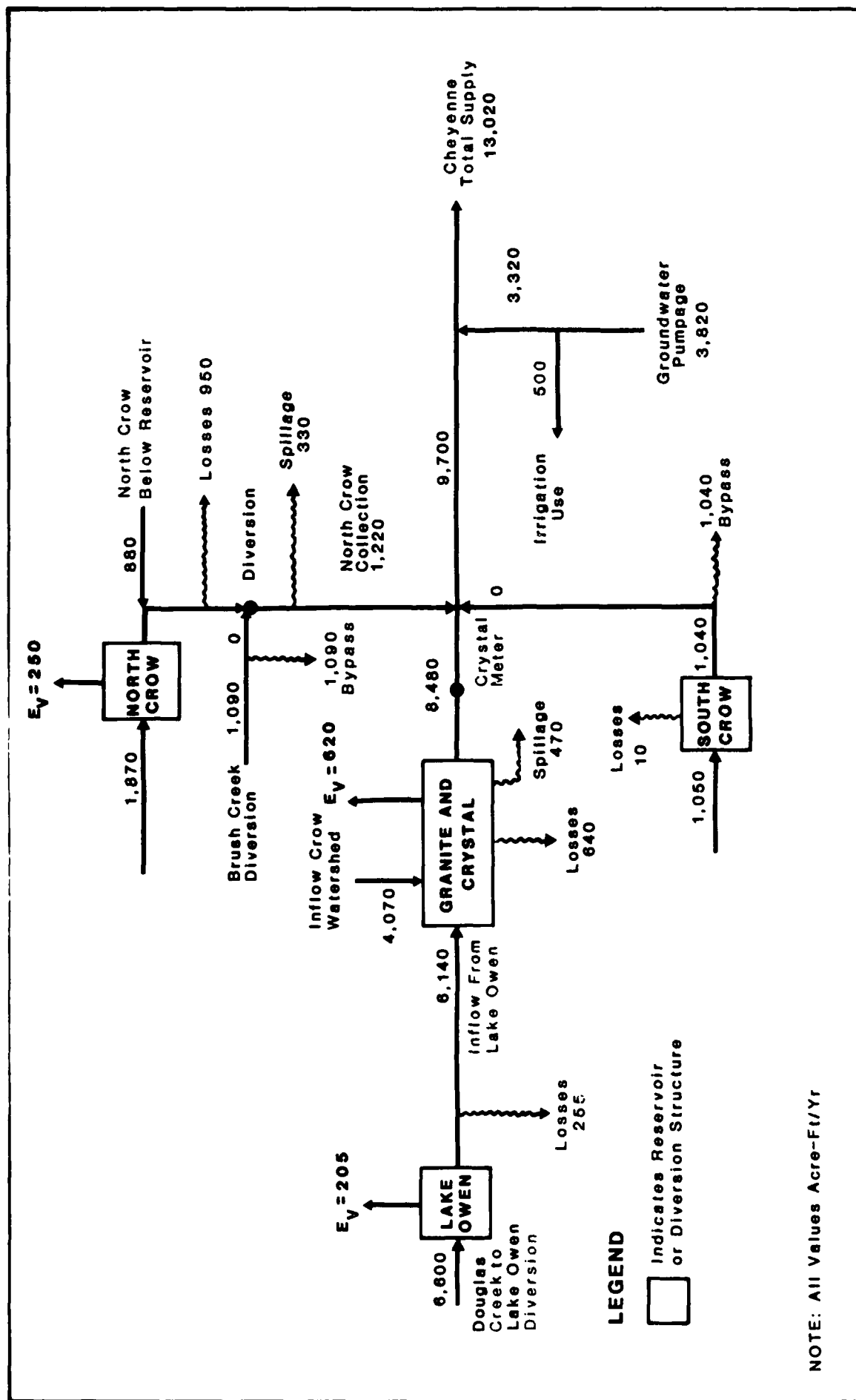
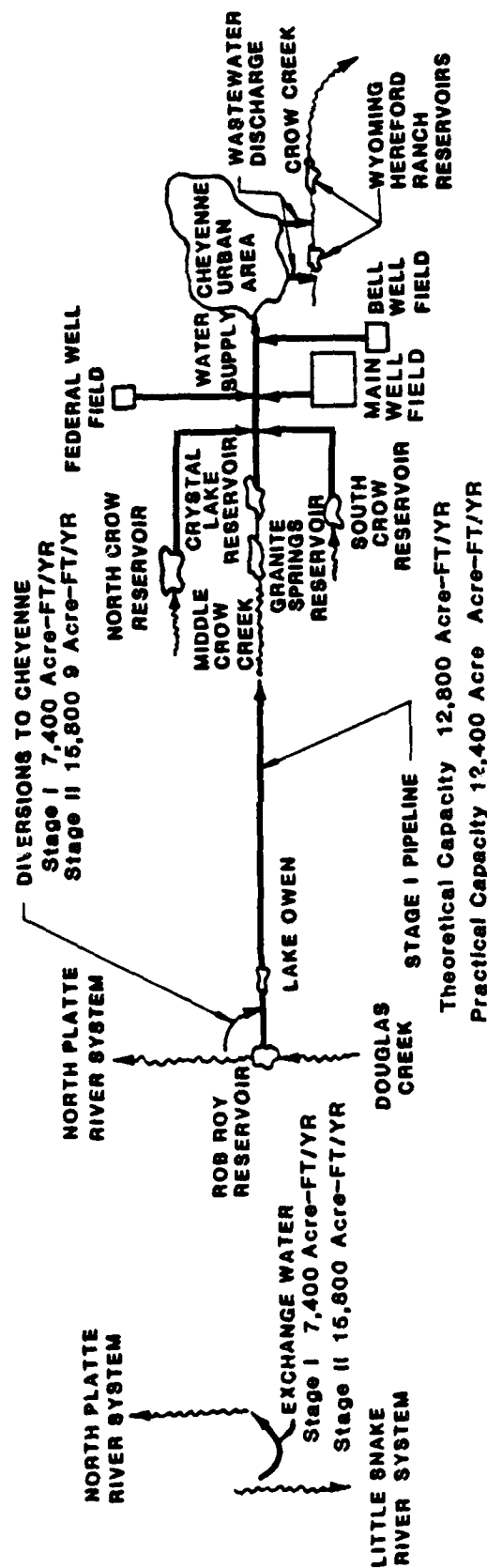


FIGURE 2.2.1-2 RAW WATER DELIVERY TO CHEYENNE



NOTE:

Diversions to Cheyenne from North Platte River System cannot exceed exchange water from the Little Snake River System to the North Platte River System.

FIGURE 2.2.1-3 SCHEMATIC OF WATER RESOURCE SYSTEM FOR CHEYENNE URBAN AREA

#### 2.2.1.2.1.2 Other Areas

Water use in Platte, Goshen, Laramie (outside the Crow Creek watershed), Banner, Kimball, and Scotts Bluff counties is about 739,000 acre-ft/yr with about 91 percent used for agricultural purposes. Existing Minuteman Launch Control Facilities in the Deployment Area use 12 acre-ft/yr. Table 2.2.1-1 summarizes current water supply and use in communities potentially impacted by increases in demand due to population immigration.

Table 2.2.1-1

#### WATER SUPPLY CAPACITY AND WATER USE IN POTENTIALLY IMPACTED COMMUNITIES

Community	Current Capacity (acre-ft/yr)	Current Use (acre-ft/yr)
Scottsbluff	11,000	4,400
Torrington	8,500	4,800
Gering	6,500	3,100
Wheatland	3,800	2,000
Pine Bluffs	2,700	500
Kimball	1,800	1,000
Chugwater	150	50
Albin	200	70

Total municipal use in these areas averages about 250 gpcd but there is considerable variation depending on the extent of industrial use. Water supply sources for all communities in the other Areas of Concentrated Study is from wells.

#### 2.2.1.2.2 Constraints on Water Use

##### 2.2.1.2.2.1 Wyoming

Use of water is controlled by the Wyoming State Engineer and Board of Control who administer the Wyoming water law. The right to beneficially use water is granted under the doctrine of prior appropriation. Procedures have been developed to control initial appropriations, changes in the point of diversion and type and place of beneficial use, changes in rights under purchase or lease of an adjudicated or unadjudicated right, and acquisition of a temporary right by either appropriation or by lease/purchase. Groundwater control areas have been established in Platte and Laramie counties where groundwater advisory boards are also involved in controlling water use. Water acquisition efforts for the project are being coordinated with the Wyoming State Engineer's Office. Groundwater rights are issued by the Wyoming State Engineer's Office in terms of peak discharge with actual discharge rates determined after review of actual pumping capacity. The discharge rates (gallons per minute [gpm]) have, in some cases, been translated into annual withdrawal (acre-ft/yr) amounts by decisions of the State Board of Control. The amounts are based on review of acreages irrigated (1.2 to 1.5 acre-ft/acre/yr) and historic use period (irrigation season) with an assumed total consumptive use. If the point or type of use of a groundwater right is changed there is no assumed impact on return flow, but the rate of discharge of the right can only be used during the historic use period. The supply may be used throughout the year if rates are reduced to match allowable annual diversions.



Surface water rights are based on 1 cubic foot per second (cfs) of flow per 70 irrigated acres with 60 percent assumed to be consumptively used (Wyoming State Engineer's Office 1983). There are no legal requirements for delivery of Lodgepole or Crow Creek water to Nebraska or Colorado, and these streams are typically dry as they near state boundaries.

Water rights to Cheyenne's wastewater effluent (that portion representing historic Crow Creek flow) have been appropriated. Appropriation has not been made of the additional effluent that will result from Stage II water imports.

In general, adjudicated and unadjudicated water rights exceed actual water use and water availability.

The Wyoming Department of Environmental Quality administers laws, regulations, and guidelines related to water quality. Surface streams and reservoirs are divided into four classifications with water quality standards developed for each. Discharges to a surface stream are controlled by a permit process. Groundwater resources are similarly divided into separate classifications, although groundwater in the Area of Concentrated Study has not yet been classified by the Wyoming Department of Environmental Quality. Discharges to the groundwater must be such that they do not make the affected water unsuitable for its use or potential use at any point of withdrawal or natural discharge to the surface water system. Nonpoint sources of pollution such as stormwater runoff are also controlled by the Wyoming Department of Environmental Quality. Wastewater treatment facilities serving the Cheyenne Urban Area discharge to Crow Creek which has been classified as a Class IV stream requiring no more than secondary treatment and disinfection prior to discharge (Wyoming Department of Environmental Quality 1979).

#### 2.2.1.2.2.2 Nebraska

Use of water is controlled by the Nebraska Department of Water Resources which administers the Nebraska water law. The right to beneficially use water is granted under a mixed riparian-appropriative system of water law. Groundwater use permits are only required in groundwater control areas except for industrial use exceeding 3,000 acre-ft/yr. No control areas have been established in the Area of Concentrated Study (Nebraska Department of Water Resources 1982). The right to use groundwater is acquired by owning the land overlying a groundwater reservoir. Procedures have been developed to control appropriations, require registration of wells, permit public water suppliers to transfer water from a remote source for use, and recently to allow changes in place of use of permitted uses if the type of use is unchanged. All nondomestic wells must be registered whether a permit is required or not. Water acquisition efforts for the project are being coordinated with the Nebraska Department of Water Resources. Groundwater permits are issued in terms of peak discharge.

Surface waters in the Area of Concentrated Study are generally under the appropriative system and are considered fully appropriated for Pumpkin and Lodgepole creeks. Surface water rights are limited to 1 cfs per 70 acres and no more than 3 acre-ft per acre of land. A U.S. Supreme Court decree apportioned the natural flow of the North Platte River between Colorado, Wyoming, and Nebraska. In general, total appropriated surface water rights and registered well discharge capacities exceed actual water use in the Area of Concentrated Study.

The Nebraska Department of Environmental Control administers laws, regulations, and guidelines related to water quality with the Nebraska Department of Health responsible for public water supply. Surface streams are divided into five general beneficial use categories with specific criteria for each based on the designated beneficial use of a stream segment.

Discharges to a surface stream are controlled by a permit process. Groundwater resources are protected by antidegradation policies and specific water quality standards which control wastewater discharges to groundwater.

#### 2.2.1.2.3 Surface Water Hydrology and Quality

Stream flow in the Area of Concentrated Study watersheds is extremely variable with peak flows occurring in the spring or early summer and low flows occurring in late summer and winter (U.S. Geological Survey 1981, 1982). Peak flows are a combination of snowmelt runoff and seasonal precipitation in the spring. Low flows are derived primarily from groundwater inflow. The chemical quality of surface waters is dependent on groundwater quality and irrigation return flow practices whereas biological quality is primarily influenced by wastewater discharges.

##### 2.2.1.2.3.1 Crow Creek Watershed

The Crow Creek watershed has a drainage area of about 460 square miles (sq mi) from its headwaters to the Carpenter Reservoir. Human activities have influenced the natural water resource system of Crow Creek. Water supply reservoirs have been constructed on the North Fork of Crow Creek (1,868 acre-ft), on Middle Crow Creek (Granite Springs, 5,320 acre-ft and Crystal Lake, 3,410 acre-ft), and the South Fork of Crow Creek (18 acre-ft). Middle Crow Creek reservoirs receive water from watershed runoff and from Cheyenne Stage I imports and deliver water via pipeline to the Cheyenne water treatment facilities. Pumpage at the Cheyenne Federal, Happy Jack, and Bell wellfields has reduced or eliminated base flow in some reaches of Crow Creek. The Cheyenne Urban Area discharges about 8,000 acre-ft/yr of wastewater to Crow Creek downstream of Cheyenne. This is about 90 percent of typical Crow Creek flow. Crow Creek loses essentially all flow to the groundwater system before reaching the Colorado state line. Water quality data collected over the past several years at F.E. Warren AFB indicate Crow Creek quality is good upstream of Cheyenne. Water quality conditions in Crow Creek and the two Wyoming Hereford Ranch reservoirs (about 880 acre-ft each), as well as the groundwater system downstream of the Cheyenne Urban Area, have been influenced by wastewater discharges. Water quality conditions near discharges include high levels of oil and grease, low dissolved oxygen, high nutrients, toxic ammonia, and elevated levels of chloride, sulfate, cadmium, chromium, and zinc. Crow Creek water quality is similar to groundwater quality in most other areas of the basin.

High flows due to snow melt and precipitation runoff have caused flooding problems from Crow Creek, Dry Creek, and Clear Creek in the Cheyenne Urban Area. Flooding is seen as a major problem in the Cheyenne Urban Area, but only the Dry Creek area has been studied in detail (BRW/Noblitt et al. 1979) although 100-year floodplains have been designated in all areas (Federal Emergency Management Agency 1982). Peak flows from various drainage areas were calculated and routed through the urban area for this study. The runoff for a 10-year, 3-hour storm event (1.7 inches of rainfall) was determined to be 1,820 cfs where Diamond Creek joins Crow Creek upstream of Cheyenne. This increases to 2,100 cfs by contributions in Cheyenne before reaching the Wyoming Hereford Ranch Reservoir No. 1. A similar analysis was conducted for runoff from a 50-year, 6-hour storm event (2.9 inches of rainfall) where peak flows were 7,740 cfs upstream of Cheyenne and 9,070 cfs at the reservoir. Some bridges and culverts do not have capacity to transmit this flow through the area.

Using representative erosion rates of 3.1 tons per acre per year (T/acre/yr) for cropland, 4.3 T/acre/yr for rangeland, and 2.2 T/acre/yr for other land (Fly et al. 1982), sediment upstream of Cheyenne was calculated at 729,000 tons per year (T/yr), and between Cheyenne and Carpenter Reservoir at 481,000 T/yr. Sediment delivery to streams is estimated at 119,000 T/yr and 86,000 T/yr for the 2 areas, respectively.

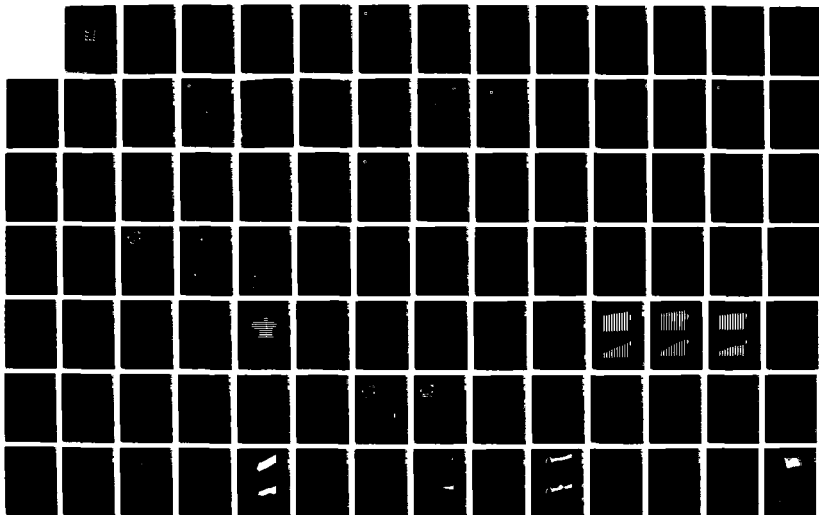
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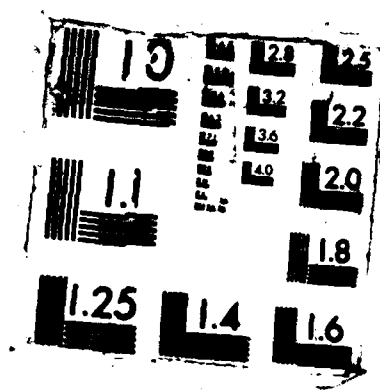
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#### 2.2.1.2.3.2 Other Areas

Other watersheds potentially impacted by project construction include Lodgepole, Horse, Pumpkin, and Chugwater creeks.

Lodgepole Creek has a drainage area of about 2,550 sq mi upstream of Sidney with about 1,160 sq mi upstream of Oliver Reservoir, 610 sq mi between Oliver Reservoir and Sidney Draw, and 780 sq mi in Sidney Draw. It is an intermittent stream that alternately gains flow from and loses flow to the groundwater basin. Groundwater pumpage in eastern Laramie County and western Kimball County has resulted in decreased base flow as measured at Bushnell, Nebraska, from about 13 cfs, prior to extensive development, to about 5 cfs at present. Lodgepole Creek has historically had flooding problems resulting from snowmelt and precipitation runoff. Oliver Reservoir (2,678 acre-ft) and Bennett Reservoir (970 acre-ft) are used for recreational and/or irrigation storage purposes and both have had sedimentation problems. Bushnell and Kimball operate wastewater treatment facilities that discharge to the creek with flows of 0.02 and 0.30 million gallons per day (mgd), respectively. Surface water quality is suitable for most uses but total dissolved solids are higher in downstream reaches than upstream. Three Launch Control Facilities and 33 Launch Facilities proposed for use in the program are located in the watershed. Existing erosion and sedimentation are estimated as follows:

Area	Erosion (1,000 T/yr)	Sediment Delivery (1,000 T/yr)
Upstream of Oliver Reservoir	2,510	310
Between Oliver Reservoir and Sidney Draw	1,320	180
Sidney Draw	1,760	240

Horse Creek has a drainage area of about 1,700 sq mi upstream of its confluence with the North Platte River with about 660 sq mi upstream of the Hawk Springs Reservoir. It is a perennial stream. Base flow is about 15 to 20 cfs near Hawk Springs Reservoir and flow averages about 70 cfs near Lyman, Nebraska. Arnold (1,140 acre-ft), Goshen Hole (4,950 acre-ft), Sinnard (1,540 acre-ft), and Hawk Springs (16,700 acre-ft) are major reservoirs used for irrigation storage. No municipalities discharge to Horse Creek. Surface water quality is suitable for most uses with water in the lower reaches somewhat more mineralized than upper reaches. Four Launch Control Facilities and 33 Launch Facilities lie within the Horse Creek watershed. Existing erosion and sedimentation were estimated at 4,000,000 T/yr with 520,000 T/yr reaching streams with 1,740,000 T/yr erosion and 240,000 T/yr sediment delivery upstream of the Hawk Springs Reservoir.

Pumpkin Creek has a drainage area of about 1,020 sq mi upstream of its confluence with the North Platte River. It is an intermittent stream in upper reaches becoming perennial in lower reaches. Base flow has been reduced by increasing groundwater irrigation. Flow averages about 30 cfs near Bridgeport, Nebraska. There are no major reservoirs and no municipal wastewater discharges to Pumpkin Creek. Surface water quality is generally suitable for most purposes. Two Launch Control Facilities and 17 Launch Facilities are located in the basin. An estimated 2,370,000 T/yr erosion occurs in the watershed with 298,000 T/yr reaching streams.

Chugwater Creek has a drainage area of about 680 sq mi upstream of its confluence with the Laramie River. It is a perennial stream. Average flow near Wheatland is about 27 cfs. There are no major reservoirs in the watershed. Wheatland discharges about 0.30 mgd to a tributary and industrial discharges have caused water quality problems near Wheatland. High total dissolved

solid levels restrict use for drinking water purposes, but surface quality is acceptable for other uses. One Launch Control Facility and 13 Launch Facilities are in the watershed. Existing erosion is estimated at 1,770,000 T/yr with 240,000 T/yr reaching the stream.

Four Launch Facilities are located in the Goshen Hole area that drains about 560 sq mi to the North Platte between the confluence of the Laramie River and the confluence of Horse Creek with the North Platte River. Average flow of the North Platte in this area is about 780 cfs with flow primarily controlled by Wheatland, Glendo, and Guernsey reservoirs. Wastewater discharges include Scottsbluff (2.5 mgd) and Terrytown (0.24 mgd). Water quality is typified by high total dissolved solids that increases significantly in the downstream direction as a result of irrigation return flow. Existing erosion in the 560-sq mi area is estimated at 1,220,000 T/yr with 170,000 T/yr reaching streams or irrigation ditches in the area.

#### **2.2.1.2.4     Groundwater Hydrology and Quality**

Groundwater used in the Area of Concentrated Study is derived from alluvium along stream channels and the Ogallala, Arikaree, White River (Brule and Chadron), Pierre, and Lance/Fox Hills aquifers. A confined aquifer (Casper Formation) occurs at depth but has not been developed as a water supply source. Groundwater flow is typically west to east trending northeast north of Lodgepole Creek tending to parallel surface drainage patterns. Groundwater quality is highly variable with nitrate exceeding primary drinking water standards in some areas and iron, sulfate, sodium, and total dissolved solids exceeding secondary drinking water standards in other areas.

##### **2.2.1.2.4.1     Crow Creek Watershed**

The Ogallala is the most developed aquifer in the Crow Creek watershed and provides most of the water pumped from the Cheyenne wellfields. Average values for wells are 330 gpm yield, 6.6 gpm per foot (gpm/ft) specific capacity, 2,100 square feet per day (sq ft/day) transmissivity, 65 feet per day (ft/day) hydraulic conductivity, and  $2.5 \times 10^{-4}$  for storativity. The Ogallala is the surficial formation in much of the watershed. The Brule Formation has large yields only in areas of secondary permeability. The Arikaree has been removed by erosion in most of the watershed. Large quantities of water are pumped from wells in the Crow Creek alluvium in the Carpenter area where 1,000 gpm wells are common. Some springs (1 of about 900 gpm) west of Cheyenne contribute to surface water flow. Recharge to the groundwater basin underlying the Crow Creek watershed above Carpenter is estimated at 21,100 acre-ft/yr (precipitation 16,600; underflow from other areas 500 acre-ft/yr; and streamflow infiltration 4,000 acre-ft/yr). Discharge is estimated at 19,600 acre-ft/yr (irrigation 9,400 acre-ft/yr; municipal/industrial use 3,800 acre-ft/yr; groundwater discharge 2,400 acre-ft/yr; and groundwater outflow to other areas 4,000 acre-ft/yr) resulting in a net gain in groundwater storage. Water levels have been decreasing upstream of Cheyenne and increasing downstream of Cheyenne. Water quality from aquifers in the area is typically good with total dissolved solids less than 500 milligrams per liter (mg/l), but nitrate levels in the Cheyenne vicinity frequently exceed the primary drinking water standard of 10 mg/l. There are 52 wells with capacities greater than 100 gpm and about 2,200 wells with capacities typically 10 to 25 gpm in 4 townships around Cheyenne (T13 and 14N, R66 and 67W).

##### **2.2.1.2.4.2     Other Areas**

The Ogallala is the most developed aquifer in the Lodgepole Creek Basin where well yields average 900 gpm. The Brule, where fractured, yields an average of 800 gpm to wells. Few wells use the Arikaree. Alluvium wells along the creek yield an average of 800 gpm. The Arikaree is the major aquifer in the Horse Creek area where well yields average 250 gpm. The Brule, where fractured, yields an average of 550 gpm. Few wells use the Ogallala. The Lance

aquifer yields an average of 200 gpm in the basin. Alluvium wells are not extensive except along the North Platte River. Yields up to 1,000 gpm and 500 gpm are obtained from the Brule and alluvial aquifers in the Pumpkin Creek area. Some wells use the Pierre or Arikaree aquifer. Alluvial deposits and the Arikaree yield up to 700 gpm in the Chugwater Creek area, but typical yields from the Brule are less than 10 gpm.

Groundwater quality is generally good, but high levels of total dissolved solids, fluoride, sulfate, nitrate, and chloride have been detected in the Goshen Hole area and in some wells in the Lance aquifer. Total dissolved solid levels in all aquifers range from 100 to over 2,000 mg/l depending on locations. Up to 18 wells are situated within a 1-mile radius of Launch Facilities and Launch Control Facilities, but typically less than 3 are within this radius. The number of wells with capacities exceeding 100 gpm within 2 miles of potentially impacted communities is 45 for Kimball, 89 for the Gering-Scottsbluff area, 108 for Torrington, 71 for Wheatland, and 38 for Pine Bluffs.

## **2.2.2 Biological Resources**

Biological resources discussed in this report include vegetation, wildlife, fisheries, unique/sensitive habitats, and threatened and endangered species. The discussion of each of these elements of biological resources is included under each respective topic heading.

The information in this section is based upon data and detailed analysis contained in the Biological Resources Environmental Planning Technical Report.

### **2.2.2.1 Region of Influence, Data Sources, and Analytic Methods**

#### **2.2.2.1.1 Region of Influence**

The Region of Influence for biological resources is defined to include those areas where resources may be directly or indirectly affected by deployment of the project. The Region of Influence is defined as an irregularly shaped polygon generated by extending 100-mile radii from Cheyenne, Wyoming, and the Scottsbluff/Gering area of Nebraska. These two locations were selected because they are projected to receive a number of project-generated immigrants. The Region of Influence includes portions of four states: Wyoming, Nebraska, Colorado, and South Dakota (Figure 2.2.2-1).

The shape and boundaries of the Region of Influence are based on input obtained through discussions with public agency personnel, concerns expressed by the public during the scoping process for the environmental impact statement, and a review of the data generated by the recreational resources component of the land use task group. Project impacts of greatest geographic extent appear to be caused by sportsmen who travel to reach desirable hunting and fishing areas. Such travel usually does not exceed a distance of 100 miles, except where particularly attractive areas exist beyond this distance. The boundaries of the Region of Influence are established at a distance of 100 miles from Scottsbluff/Gering and Cheyenne, extending to 150 miles west of Cheyenne to include such areas as Seminoe, Alcova, and Pathfinder reservoirs.

Within this broad Region of Influence is an Area of Concentrated Study which includes locations where the majority of direct impact to biological resources will take place. The Area of Concentrated Study consists of two parts, the flight portion and F.E. Warren AFB. The flight portion is defined by an irregular polygon formed by a line linking the outermost perimeters of the ten missile Flights. Existing Minuteman silos, roadways designated for project use, and the disjunct F.E. Warren AFB will be considered as site-specific areas within the Area of Concentrated Study.

The Flight boundaries were used to delineate the Flight portion of the Area of Concentrated Study (Figure 2.2.2-1). The F.E. Warren AFB portion of the Area of Concentrated Study includes those areas of the base where facility modifications, upgrade, or construction will take place, as well as closely adjacent roadways and/or interchanges that may be affected by the proposed project. For a more complete justification of the Area of Concentrated Study, see Section 3.2.2.

#### **2.2.2.1.2 Data Sources**

##### **2.2.2.1.2.1 Primary Data Sources**

Primary data sources included helicopter overflights of the 100 Minuteman silos, potentially impacted stream crossings, and the proposed overland communication cable routes. In addition, field reconnaissance surveys were conducted along potentially impacted road



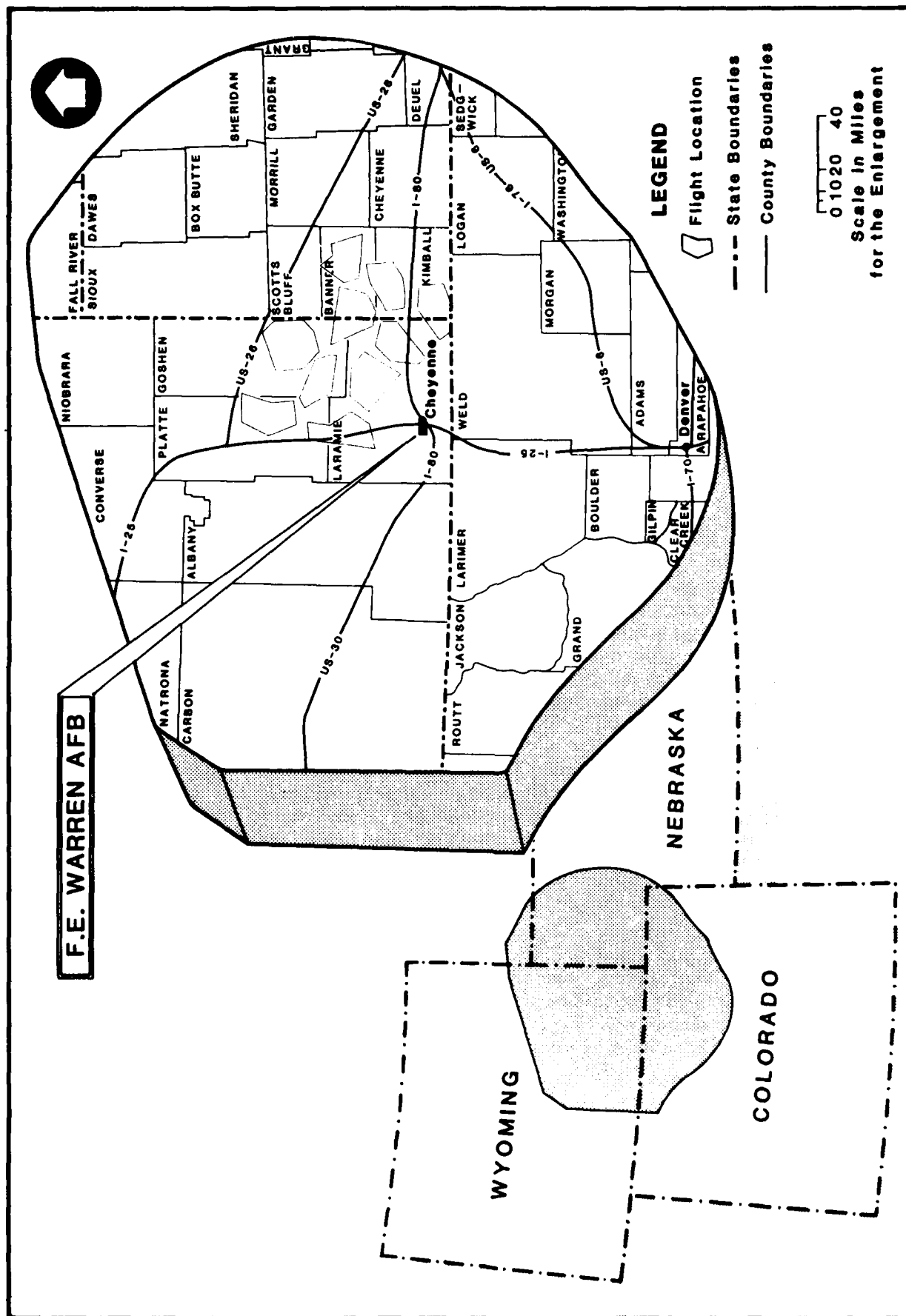


FIGURE 2.2.2-1 REGION OF INFLUENCE FOR BIOLOGICAL RESOURCES

corridors, silo locations, and communication cable pathways. Helicopter overflights and field surveys were also conducted at F.E. Warren AFB. The field surveys throughout the project area include:

- o Small mammal live trapping;
- o Road counts - raptors, big game;
- o Deer pellet group transects;
- o Passerine bird surveys;
- o Black-footed ferret surveys;
- o Fisheries studies - electroshocking, benthos collection, periphyton sampling, water quality sampling;
- o Vegetation sampling - line intercept/belt transects, one meter and one tenth meter hoops;
  - percent cover;
  - tree and shrub densities;
  - percent composition; and
  - tree coring, height, diameter breast height (dbh).

Aerial photography was used as a primary data source with ground validation conducted in some locations. Ground validation included vehicle road surveys and representative vegetation sampling.

#### 2.2.2.1.2.2 Secondary Data Sources

The secondary data necessary for preparation of this report were gathered from the available literature, environmental analysis documents (environmental impact reports, environmental impact statements, and Wyoming industrial siting applications), management and regulatory agency files, and university research files. Contacts (visits, telephone, and written correspondence) with state and federal agency personnel, university researchers, and other nongovernmental organizations provided additional unpublished but valuable background data pertinent to the Region of Influence and the more site-specific areas included within the biological Area of Concentrated Study.

Principal agency and interest group data sources included the Wyoming Game and Fish Department, Wyoming Natural Heritage Program, Wyoming Department of Environmental Quality, and the Wyoming Industrial Siting Administration. Other sources included the Colorado Division of Wildlife, the Colorado Natural Heritage Program, the U.S. Fish and Wildlife Service, U.S. Forest Service, Soil Conservation Service, Bureau of Land Management, the Nebraska Game and Parks Commission, South Dakota Game, Fish and Parks Department, and the South Dakota Department of Water and Natural Resources.

In addition, a variety of other groups was contacted regarding their concerns and any appropriate and useful data held in their files. These included the Nature Conservancy, Wyoming Wildlife Federation, Audubon Society, and the Sierra Club, among others.

#### 2.2.2.1.3 Analytic Methods

The methodology employed for existing conditions consisted primarily of an inventory assessment. Both primary and secondary data sources were utilized. Data from the overflights, reconnaissance surveys, literature, and personal communications were qualitatively evaluated, integrated, and used to develop the description of existing conditions. Information from overflights was used to identify vegetation types, develop vegetation maps at a scale of 1:24,000, and document maps at 1:62,500. Prairie dog towns were identified and mapped to comply with U.S. Fish and Wildlife Service guidelines for conducting black-footed ferret surveys. Aerial surveys also provided information on big game summer use areas and validated mapped information developed from secondary data sources. Permanent and intermittent streams were identified for mapping purposes and location of sampling sites.

Ground surveys were used to validate aerial information and to characterize the vegetation and wildlife within the various habitat types within the Area of Concentrated Study. Primary data collected during the aerial and ground surveys were used in conjunction with information provided by secondary data sources to describe the existing conditions of the biological resources in the Area of Concentrated Study as well as the Region of Influence.

Future baseline projections of the human population developed for the human resources analyses were considered to increase disruptive pressures on the biological resources of the region. Therefore, the incremental short and long-term increases in disruption of biological resources attributable to the project were evaluated as to their potential for aggravating existing and expected future conditions.

#### 2.2.2.2 Existing Conditions

##### 2.2.2.2.1 Vegetation

Vegetation within the Region of Influence is variable, dominated by coniferous forests in the Rocky Mountain region to the west, and by prairie grasslands on the plains of eastern Wyoming, northern Colorado, western Nebraska, and South Dakota (Laycock 1979). The dominant native vegetation throughout the majority of the Region of Influence is short-grass prairie. This vegetation type is composed of a variety of sod-forming grasses and forbs with shrubs occurring infrequently (Weaver 1954). The dominant native grasses are blue grama and buffalo grass (Laycock 1979). Pockets of mid or mixed grasses occur where topography and soils provide greater moisture or where there is little or no grazing pressure. Short-grass prairie within the Region of Influence is currently used for rangeland or has been converted to agricultural use, particularly irrigated and dry land farming (University of Wyoming 1982). Unique plant communities within the Region of Influence include portions of the Sandhills prairie in Nebraska and Pawnee National Grasslands in northern Colorado. Native vegetation described for the Area of Concentrated Study includes vegetation types occurring adjacent to road corridors, within communication (cable) paths, and adjacent to silos. The dominant vegetation type within the Area of Concentrated Study is grassland with large acreages committed to agriculture. Shrubland, woodland, rock outcrop, meadow, and riparian vegetation types are also present as minor components. Grasslands within the Area of Concentrated Study are composed of three types (mixed and short-grass prairies, and introduced grassland). The majority of the grasslands in the Area of Concentrated Study exhibit a short-grass prairie character with blue grama and buffalo grass dominant, and bunch grasses occurring less frequently. Introduced plant species including crested wheatgrass and smooth brome are used in portions of the short-grass prairie for pasture grasses, for grazing and hay operations, and for reclaiming disturbed roadsides.

Mixed-grass prairie occurs in small portions of the Area of Concentrated Study, particularly where there is little or no grazing pressure. Species composition of the mixed-grass prairie within the Area of Concentrated Study is typical of mixed-grass prairie vegetation prior to human perturbations. Short-grasses including blue grama and buffalo grass generally persist below an overstory of taller grasses such as western wheatgrass and needle-and-thread grass.

Shrubland is also limited in distribution within the Area of Concentrated Study. The three common shrub types (mountain mahogany, silver sagebrush, and sand sagebrush) are typical of shrubland in the region. Mountain mahogany generally occurs on rocky slopes at higher elevations. It is restricted to the northwestern portion of the Area of Concentrated Study and along the southern border of Pine Bluffs in Wyoming. The dominant species present are mountain mahogany and skunkbush.

The sand sagebrush type occurs in pockets throughout the Area of Concentrated Study where it is restricted to areas with loose sandy soils. Sand sagebrush is the dominant shrub, and common associates include Indian rice-grass, sandhill muhly, and prairie sand-reed grass.

The silver sagebrush type is common in the western portion of the Area of Concentrated Study and is associated with disturbed areas including draws, alluvial fans, and areas of intensive grazing pressure. Species composition includes silver sagebrush as a dominant, as well as fringed sagewort and fleabane.

Ponderosa pine and introduced woodlands occur within the Area of Concentrated Study. Ponderosa pine woodlands occur on some of the highest elevations in the Area of Concentrated Study, particularly where caprock and other exposed rock outcrops occur. Shrubs including mountain mahogany and skunkbush are common in this vegetation type. Grasses and forbs such as needle-and-thread grass and copper mallow also occur frequently in the ponderosa pine type. Introduced woodlands, planted as windbreaks, occur at scattered locations within the Area of Concentrated Study and are usually associated with both active and abandoned farmsteads. The rock outcrop vegetation type is restricted to areas with hard caprock and is present as a very minor component of the vegetation within the Area of Concentrated Study.

Meadow vegetation is limited, within the Area of Concentrated Study, to drainages near the major creeks and around margins of ponds. Riparian vegetation in the Area of Concentrated Study, typical of riparian vegetation in the region, is found along the major streams and associated oxbows. Plant species with more mesic habitat requirements dominate the riparian areas including cottonwood, box elder, willows, cattails, rushes, and sedges.

Native vegetation types on F.E. Warren AFB are characteristic of those found in southeastern Wyoming and the Area of Concentrated Study. However, because of the restricted land use associated with base activities, vegetation, particularly on the southern portion of the base, is relatively undisturbed. This represents a unique situation in contrast to human-related disturbances in the surrounding area including urban development in Cheyenne, and county-wide grazing and agricultural activities. Four vegetation types occur on F.E. Warren AFB: grassland, meadow, riparian, and disturbed. A majority of the planned project facilities occur in disturbed areas. However, certain segments of existing roads, new road alignments, and utilities cross riparian vegetation along the Diamond and Crow Creek drainages that support the Colorado butterfly plant (a Federal Category One species).

Vegetation types present within the Area of Concentrated Study are also likely to occur at other potentially disturbed areas, such as the potential quarry sites and dispatch stations outside of the Area of Concentrated Study.

#### **2.2.2.2.2 Wildlife**

##### **2.2.2.2.2.1 Big Game**

Seven big game species commonly occur within the Region of Influence including pronghorn, mule deer, white-tailed deer, elk, bighorn sheep, black bear, and mountain lion. In addition, the Colorado Division of Wildlife has reintroduced a small population of moose to the Illinois River drainage in north-central Colorado.

Drainages and topography influence the general location of big game habitats within the Area of Concentrated Study. Pronghorn, mule deer, and white-tailed deer commonly occur where suitable habitat is present. The nearest elk habitat occurs approximately 1 to 2 miles northwest of Flight Q (Wyoming Game and Fish Department 1982a). The eastern terminus of a pronghorn migration route is located in the northern portion of Flight Q (Wyoming Game and Fish Department 1982b). Critical-winter-yearlong habitat for mule deer is located along Horse and Chugwater creeks west of Interstate 25 in Flight Q (Wyoming Game and Fish Department 1980a). In the Nebraska portion of the Area of Concentrated Study, high deer densities (both mule deer and white-tailed deer combined) occur in the Wildcat Hills and in west-central Banner County (Nebraska Game and Parks Commission 1972, Nebraska Game and Parks Commission 1983). Although there have been recent sightings of black bear and mountain lion within the Area of Concentrated Study, neither species is considered common in the area.

Pronghorn, mule deer, and white-tailed deer occur year-round on F.E. Warren AFB. Pronghorn tend to prefer the grassland habitats in the northern and southwestern portions of the base, while both deer species utilize Crow and Diamond Creek drainages. Field data indicate deer summer use is concentrated along Crow Creek.

Since the locations of aggregate quarries and staging areas for the Proposed Action are not presently specified, the big game habitat composition of these sites is unknown.

##### **2.2.2.2.2.2 Furbearers**

Twenty-one species classified as furbearers may occur in different portions of the Region of Influence and Area of Concentrated Study. The location and numbers of these populations depend primarily on habitat availability. Aquatic habitats within these areas support muskrat and beaver. Species using riparian habitats include mink, skunk, and raccoon. Weasel, jackrabbit, fox, badger, and coyote use a variety of more widespread habitats, including grassland and agricultural areas. These species can be expected to occur in the Flight portion of the Area of Concentrated Study and in appropriate habitats within F.E. Warren AFB.

##### **2.2.2.2.2.3 Nongame Mammals**

Sixty-seven species of nongame mammals occur within the Region of Influence. Most of these species are common or abundant in their preferred habitats. In addition, a number of species of nongame mammals within the Area of Concentrated Study have limited distributions and/or low population densities. Ten of these species have been observed within the Flight portion of the Area of Concentrated Study or F.E. Warren AFB (Wyoming Natural Heritage Program 1983, Wyoming Game and Fish Department 1983a). One of the species, the meadow jumping mouse, is on the Wyoming Game and Fish Department list of rare mammal species (Wyoming Game and Fish Department 1977). None of these species were observed during field studies in the Area of Concentrated Study.

#### 2.2.2.2.4 Upland Game

Twenty-one species of upland game birds and mammals utilize areas within the Region of Influence. Due to habitat limitations, several of the upland game species, including the white-tailed ptarmigan, gray partridge, chukar, and sandhill crane, are restricted to relatively small areas of the Region of Influence; other species such as the mourning dove and cottontail rabbit have relatively wide distribution within the Region of Influence. The majority of upland game within the Region of Influence are considered common or abundant (Strickland 1979, 1980, 1981, 1982; Colorado Division of Wildlife 1978a, 1979, 1980, 1981, 1982; Mitchell 1978, 1979, 1980, 1981). However, turkey and sage grouse have small populations and limited distributions within the Area of Concentrated Study. Additional species that occur in the Area of Concentrated Study and F.E. Warren AFB include the ring-necked pheasant, bobwhite, mourning dove, sharp-tailed grouse, cottontail rabbit, and fox squirrel.

#### 2.2.2.2.5 Waterfowl

Twenty-seven waterfowl species occur in the Region of Influence. Major concentration areas include lakes, wildlife refuges, North and South Platte rivers, Niobrara River, and a portion of the Sandhills area in Nebraska (Nebraska Game and Parks Commission 1972, Colorado Division of Wildlife n.d., Wyoming Game and Fish Department 1972). Waterfowl populations within the Region of Influence fluctuate from year to year, depending upon nesting success (Wyoming Game and Fish Department 1972, Wyoming Game and Fish Department n.d.-a). Springer Wildlife Management Unit and Table Mountain are the two major areas within the Area of Concentrated Study that contain high-quality waterfowl habitat (Bellrose 1980). Both areas are located within Flight S of the Area of Concentrated Study. Waterfowl habitat on F.E. Warren AFB is limited to Crow and Diamond creeks, Lake Pearson, scattered sinks, and potholes. These areas provide limited amounts of breeding habitat for waterfowl. Waterfowl habitat may exist at the potential aggregate quarries.

#### 2.2.2.2.6 Raptors

Twenty-eight species of raptors are known to occur within the Region of Influence (Nebraska Game and Parks Commission 1972, Chase et al. 1983, Oakleaf et al. 1982). The species composition within the Region of Influence varies with habitat and season. Most of the raptor populations are either stable or increasing (Wyoming Game and Fish Department 1983c).

Raptor species occurring within the Area of Concentrated Study are those typically associated with grassland, agricultural, and riparian habitats. Forty-seven raptor nests are known to occur within 1 to 2 miles of access roads and silos within the Area of Concentrated Study (Wyoming Game and Fish Department 1983b, Nebraska Game and Parks Commission 1983). In addition, a Swainson's hawk nest was observed at F.E. Warren AFB. Raptors may also occur at the potential aggregate quarries and dispatch stations.

#### 2.2.2.2.7 Other Birds

More than 200 species of other birds (birds that are not raptors, waterfowl, or upland game) occur within the Region of Influence (Nebraska Game and Parks Commission 1972, Chase et al. 1983, Oakleaf et al. 1982). Species expected within the Area of Concentrated Study and F.E. Warren AFB are primarily associated with grassland, agricultural, and riparian habitats. Approximately one-half of these species are considered common or abundant (Chase et al. 1983, Oakleaf et al. 1982).

#### 2.2.2.2.8 Reptiles and Amphibians

Reptiles and amphibians are generally restricted to lower elevations within the Region of Influence. Approximately 12 species of amphibians and 28 species of reptiles may be expected to utilize the Region of Influence. One amphibian species, the Wyoming (Baxter's) toad, has recently been proposed for possible endangered status by the U.S. Fish and Wildlife Service (U.S. Fish and Wildlife Service 1983). The pale milk snake, western smooth green snake, and wood frog have special state status within Wyoming and Colorado and occur within the Region of Influence. Reptiles and amphibians occurring in the Area of Concentrated Study and other potentially disturbed areas are typical of those inhabiting the region; the pale milk snake may occur in the northern portion of the Area of Concentrated Study in Flights T, S, R, Q, B, and P (Baxter and Stone 1980).

#### 2.2.2.2.3 Fisheries Resources

##### 2.2.2.2.3.1 Physical Conditions

The Region of Influence includes a major portion of the Platte River drainage basin in Wyoming, Nebraska, Colorado, and South Dakota, as well as a portion of the Colorado River drainage basin. Water features in the Region of Influence are numerous and diverse and include high alpine lakes, lowland streams, lakes, and reservoirs.

Aquatic resources in the Area of Concentrated Study are contained within the Platte River drainage basin. The Flights are drained by a number of perennial and intermittent streams. Flights P, Q, R, S, and T contain the largest number of aquatic resources, including Chugwater, Horse, and Bear creeks. The remaining Flights are drained by several perennial and intermittent streams including Horse and Lodgepole creeks. Aquatic resources within F.E. Warren AFB include Crow Creek and Diamond Creek in addition to the Lake Pearson system. These streams are contained in the Platte River drainage system.

The physicochemical conditions of the aquatic resources in the Region of Influence and Area of Concentrated Study vary according to geographical diversity and differential water uses. In general, the physicochemical variability increases downstream, varying with substrates and localized conditions.

##### 2.2.2.2.3.2 Biological Conditions

Because of the variety of water features and physicochemical conditions present in the Region of Influence, the streams, lakes, and reservoirs support diverse coldwater and warmwater communities of plankton, invertebrates, and fishes. Generally, the types of aquatic organisms found in a particular area are indicative of the elevation, water quality, flow, substrate type, and intraspecific competition present. Approximately 60 species of fish are found in the Region of Influence.

Field studies and available data (Wyoming Game and Fish Department 1983b) on the aquatic resources in the Area of Concentrated Study in Wyoming suggest that most of the streams are small and shallow with minimum cover, resulting in relatively low fish productivity. Brook and brown trout were collected in Horse Creek within the Flight area. Streams flowing through F.E. Warren AFB support a warmwater rough fishery. The only game species observed was the green sunfish. Although trout have reportedly been caught in Crow Creek (USAF 1983), physical and biological conditions may not provide satisfactory habitat on a year-round basis.

#### 2.2.2.2.3.3 Fisheries

The wide variety of habitats in the Region of Influence provides a number of cold and warmwater angling opportunities. Several rivers, streams, lakes, and reservoirs in the Region of Influence are considered valuable fisheries (U.S. Fish and Wildlife Service 1978a,b,c,d). Important fisheries in the Region of Influence include Angostura Reservoir in South Dakota; the Big Thompson and Cache La Poudre rivers in Colorado; Oliver Reservoir, and Lakes McConaughy and Minatare in Nebraska; and Glendo, Seminoe, and Pathfinder reservoirs, as well as the Laramie Plains Lakes in Wyoming (U.S. Fish and Wildlife Service 1978a,b,c,d). Game fish in the Region of Influence include rainbow, brook, and brown trout, walleye, small and largemouth bass, and yellow perch.

Limited creel census data on the aquatic resources in the Area of Concentrated Study indicate that Horse and Richeau creeks receive the greatest amount of fishing pressure with values of 441 and 80 user days per mile, respectively (Wyoming Game and Fish Department 1983b). Creel census or species composition data are not available for several other streams present in the Area of Concentrated Study.

Rainbow and brown trout are stocked annually in the Lake Pearson system. Although Crow Creek within F.E. Warren AFB is not stocked, trout have reportedly been caught at the southern end of the base (USAF 1983). In 1982, a total of 1,261 base fishing permits were issued (McConnell and Cormier 1982).

#### 2.2.2.2.4 Unique and Sensitive Habitats

##### 2.2.2.2.4.1 Vegetation

Several limestone quarries east of Laramie, Wyoming provide unique habitat for Laramie false sagebrush (Wyoming Natural Heritage Program 1983), a federally proposed endangered species occurring within the Region of Influence. Riparian vegetation and associated wetland habitat is present along the major drainages. The riparian areas along the Crow and Diamond Creek drainages, in particular, are considered sensitive habitats because of the presence of the Colorado butterfly plant, a Federal Category One species.

##### 2.2.2.2.4.2 Wildlife

Critical-winter-yearlong habitat for mule deer occurs within the Area of Concentrated Study along Horse and Chugwater creeks west of Interstate 25 in Flight Q (Wyoming Game and Fish Department 1980a). A pronghorn migration route has its eastern terminus in the northern portion of Flight Q (Wyoming Game and Fish Department 1982b). Pronghorn migrate into winter-yearlong habitat in Flight Q from summer range located to the west. No lambing, fawning, or calving grounds are presently known to occur in the Area of Concentrated Study (Wyoming Game and Fish Department n.d.-b,c; 1978; 1979a,b; 1980a,b; 1982a,b). No unique or sensitive wildlife habitat is known to occur on F.E. Warren AFB or in the vicinity of the proposed dispatch stations.

##### 2.2.2.2.4.3 Fisheries

No unique or sensitive aquatic habitats are found in the Region of Influence or Area of Concentrated Study.



## 2.2.2.2.5 Threatened and Endangered Species

### 2.2.2.2.5.1 Vegetation

Within the Region of Influence, one plant taxa, the Northpark phacelia, found in Jackson County, Colorado, is a federally listed endangered species (Colorado Natural Heritage Program 1983). Three plant species listed under Federal Categories One and Two also occur within the Region of Influence (U.S. Fish and Wildlife Service 1983). The present distribution of the Laramie false sagebrush, a Category One species, is restricted to limestone quarries near Laramie, Wyoming (Wyoming Natural Heritage Program 1983). Hayden's penstemon, a Category Two species of concern, is a successional endemic that is confined to wind-formed blowouts in the Nebraska Sandhills (Wyoming Natural Heritage Program 1983, Weedon and Norton 1982). The Colorado butterfly plant, a Federal Category One species, occurs within F.E. Warren AFB along the Crow and Diamond Creek drainages and along an unnamed drainage south of Diamond Creek in the vicinity of Cheyenne Road and Parade Avenue.

Distributions of 14 other plant species, considered rare in either Wyoming or Nebraska, include the Area of Concentrated Study; however, only the woolly milkvetch, a state (Wyoming) rare plant, was observed growing at 8 locations within the Area of Concentrated Study. One of these locations was on a silo site, within a few meters of the security fence, and another was observed in the northern portion of the SB-1 cable pathway.

### 2.2.2.2.5.2 Wildlife

Four species of federally endangered wildlife, the bald eagle, peregrine falcon, whooping crane, black-footed ferret, and one proposed species, the Wyoming toad, may occur within the Region of Influence. The bald eagle is primarily a winter resident of the Region of Influence and is most common along lakes and rivers. Two known nest locations are within the western portion of the Region of Influence along the North Platte River. Peregrine falcons and whooping cranes may occur primarily as migrants within the Region of Influence. Prairie dog colonies (a major food source of the black-footed ferret) are scattered throughout the Region of Influence. However, the occurrence, distribution, and abundance of the black-footed ferret is not known. The known distribution of the Wyoming toad includes only the Laramie Basin. Only the bald eagle is known to occur within the Area of Concentrated Study. Concentration areas are in Flight S (Wyoming Game and Fish Department 1983b, Wyoming Game and Fish Department 1983a). The peregrine falcon and whooping crane may occur as infrequent migrants. Prairie dog towns occur within the Area of Concentrated Study. Five colonies may be impacted by project-related construction activities. No evidence of black-footed ferret activity was observed during initial field surveys at the five prairie dog towns. None of these five wildlife species are known to occur at F.E. Warren AFB. The bald eagle and peregrine falcon may occur as infrequent migrants. The whooping crane and black-footed ferret are not likely to occur because of the lack of suitable habitat.

Several species of special concern to the states (defined by the states as endangered, threatened, rare, or of high research/management priority) occur within the Region of Influence, and potentially occur within the Area of Concentrated Study. These species include: the mountain plover and swift fox in Nebraska, and burrowing owl, meadow jumping mouse, pale milk snake, and swift fox in Wyoming.

### 2.2.2.2.5.3 Fisheries Resources

Five species listed as threatened and one species listed as endangered by the South Dakota Game, Fish and Parks Department occur in the drainages within the South Dakota portion of the Region of Influence. These species include the sturgeon chub, northern red belly dace,

longnose sucker, and plains topminnow. The pearl dace is listed as endangered by the South Dakota Game, Fish and Parks Department (South Dakota Game, Fish and Parks Department 1983).

The greenback cutthroat trout is federally listed as endangered and state listed by Colorado as threatened. It is found in the Colorado portion of the *Region of Influence in the drainages of the Cache La Poudre and Big Thompson rivers* (Colorado Division of Wildlife 1978b). The northern pearl dace and finescale dace are considered rare by the Wyoming Game and Fish Department. They occur in the Niobrara River near the Wyoming-Nebraska border.

There are no federally listed, threatened, or endangered fish species in the Area of Concentrated Study. The suckermouth minnow is listed as rare by the Wyoming Game and Fish Department. Historically it has been recorded in Lodgepole Creek in Laramie County, although recent collections have been only near the mouth of the Laramie River (Baxter and Simon 1970).

The orangethroat darter has an undetermined status in Wyoming, but because there is evidence of declining populations, maintenance or increase of the current populations is a priority (Wyoming Game and Fish Department 1977). The species was recorded in 1969 in Lodgepole Creek near the Wyoming-Nebraska border. That population was eliminated during a stream poisoning for rough fish. Attempts to reintroduce the species into Lodgepole Creek seem to have been unsuccessful. Some specimens were recorded recently in Nebraska (Wyoming Game and Fish Department 1983c), and the species may potentially occur upstream in Wyoming.

The common shiner occurring in Bushnell, Crow, and Diamond creeks is listed as rare by the Wyoming Game and Fish Department. Agency management concern has been low because populations appear to be stable and may also occur in various streams throughout southeastern Wyoming (Wyoming Game and Fish Department, personal communication 1983c).

## **2.2.3      Geologic Resources**

This section presents the Region of Influence, data sources, and existing conditions for geologic resources for the project. Geologic resources include geologic hazards (with emphasis on regional seismicity and faulting), energy and mineral resources (with emphasis on aggregate), and soil resources (with emphasis on agricultural and erosional processes).

The information in this section is based upon data and detailed analysis contained in the Geologic Resources Environmental Planning Technical Report.

### **2.2.3.1      Region of Influence, Data Sources, and Analytic Methods**

#### **2.2.3.1.1      Region of Influence**

The overall Region of Influence for geologic resources includes all of Laramie County, Wyoming; Kimball and Banner counties, Nebraska; portions of Albany, Platte, and Goshen counties, Wyoming; portions of Cheyenne, Morrill, Scotts Bluff, and Sioux counties, Nebraska; and portions of Logan, Morgan, and Weld counties, Colorado (Figure 2.2.3-1). The Region of Influence is an irregularly shaped area bounded on the north by an east-west line from the divide of the Laramie Range to Guernsey, Wyoming, then northeastward to Rawhide Creek near Jay Em, Wyoming, then south to the northern extent of the valley of the North Platte River, then southeastward to near Bridgeport, Nebraska. The eastern boundary is formed by a north-south line extending from the North Platte River near Bridgeport south to Sidney, Nebraska, primarily along Highway 385, and then south and southwest from Sidney along Road 113 to the southern extent of the valley of the South Platte River. The southern boundary follows westward along the southern extent of the South Platte River Valley to Goodrich, Colorado, then in a straight line northwestward to the intersection of Interstate 25 and the Colorado-Wyoming state line. It then continues westward along the state boundary and terminates at the divide of the Laramie Range. The nearly north-south trending western boundary is delineated by the divide of the Laramie Range. This large Region of Influence is defined primarily for energy and mineral resources, specifically aggregate, and is also applicable to geologic hazards. Smaller Areas of Concentrated Study within the Region of Influence are defined specifically for faulting investigations and soil resources.

##### **2.2.3.1.1.1      Geologic Hazards**

The Region of Influence for geologic hazards is defined to include those areas in which implementation and operation of the project may be affected by naturally occurring geologic phenomena, or project activities may accelerate or initiate geologic processes. Normally, the Region of Influence for geologic hazards is smaller than the Region of Influence for energy and mineral resources because considerations of geologic hazards are often site-specific. Since regional seismicity can impact a broad area, the Region of Influence for geologic hazards was expanded to coincide with the overall Region of Influence. However, even though faulting was studied throughout the Region of Influence, the Wheatland-Whalen Fault System has been defined as an Area of Concentrated Study because of its direct importance to the project.

##### **2.2.3.1.1.2      Energy and Mineral Resources**

The Region of Influence for energy and mineral resources, specifically aggregate, coincides with, and is the basis for, the overall geologic resources Region of Influence. Other elements of energy and mineral resources are addressed according to site-specific locations within the Region of Influence. The Region of Influence for energy and mineral resources, specifically

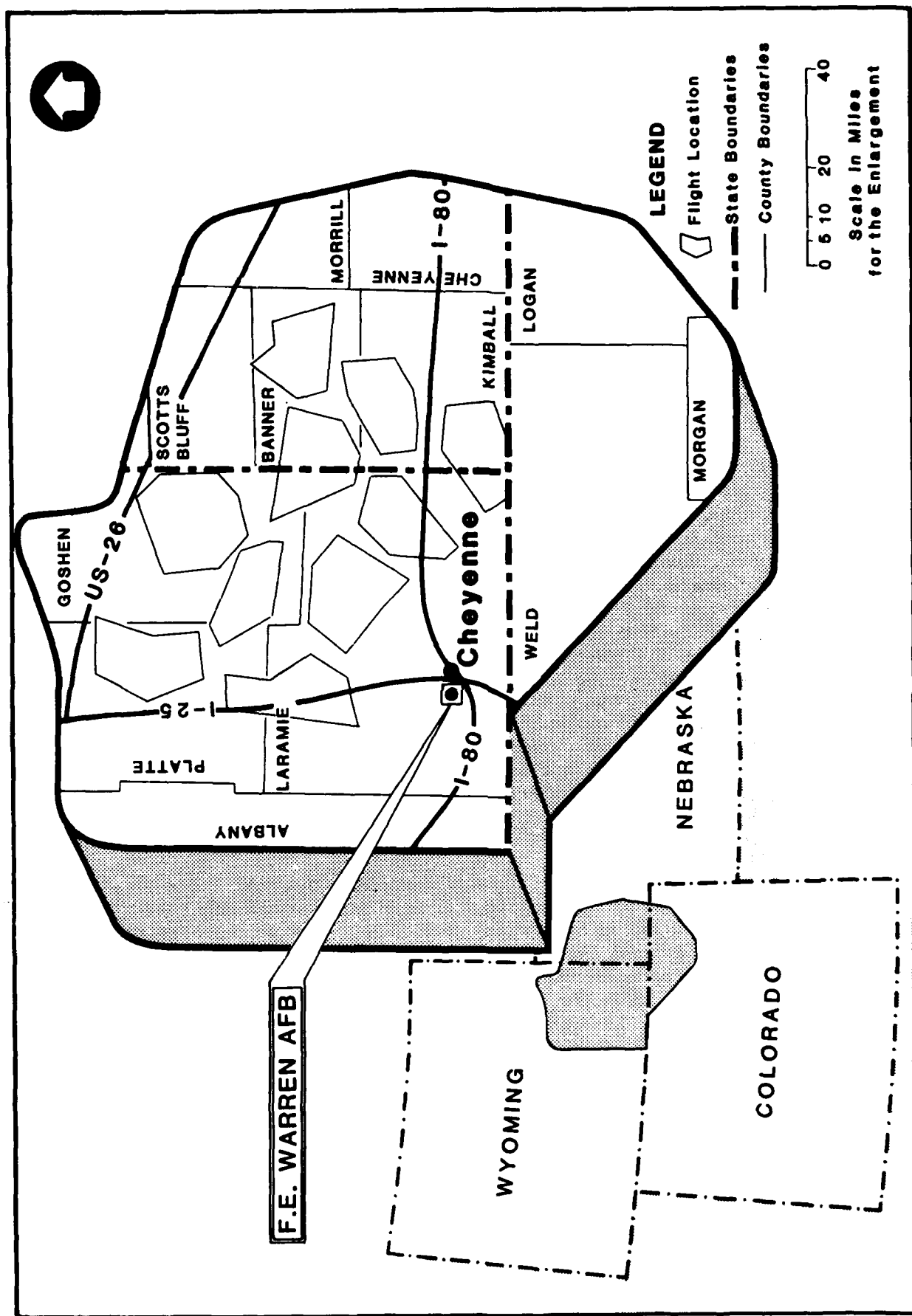


FIGURE 2.2.3-1 REGION OF INFLUENCE FOR GEOLOGIC RESOURCES

aggregate, encompasses known regional sources of aggregate and areas likely to serve as additional sources if needed. These areas lie within economic haul distances to the potential construction sites throughout the Deployment Area.

#### 2.2.3.1.1.3 Soil Resources

The Areas of Concentrated Study for soil resources are restricted to specific locations such as construction sites and support areas directly disturbed by the project. These site-specific locations are justified because of the direct relationship between specific construction locations and areas of likely soil disturbance. The current planning information for the project indicates disturbance will be confined to narrow corridors for transportation, communication routes, and construction at F.E. Warren AFB. For a more complete justification for the Areas of Concentrated Study, see Section 3.2.3.1.

#### 2.2.3.1.2 Data Sources

The major literature sources used in developing the profile of existing geologic resources include: U.S. Geological Survey (USGS); U.S. Bureau of Mines; Wyoming Oil and Gas Conservation Commission; U.S. Department of Agriculture (USDA) Soil Conservation Service (SCS); Conservation and Survey Division, Institute of Agriculture and Natural Resources, University of Nebraska, Lincoln; Geological Survey of Wyoming; Nebraska Department of Roads; and Colorado Geological Survey. Specific references from these sources are cited in this section and are detailed in Appendix D.

The following are state and county groups and agencies contacted to gather input and suggestions for this project: Geological Survey of Wyoming; Wyoming Oil and Gas Conservation Commission; Wyoming State Engineers' Office; Wyoming Highway Department, Wyoming, Nebraska, and Colorado offices of the SCS; University of Nebraska, Conservation and Survey Division; Nebraska Oil and Gas Conservation Commission; Nebraska Department of Roads; and state offices of the USGS.

Primary data include:

- o Energy and Mineral Resources Map for the technical report;
- o Preliminary Field Investigations Report: M-X Closely Spaced Basing;
- o Regional Aggregate Resources Evaluation, F.E. Warren AFB Candidate Suitable Area, Wyoming;
- o Working Paper Draft on the Potential for Earthquakes and Surface Faulting on the Wheatland-Whalen Fault System, Southeastern Wyoming; and
- o Construction Materials Survey (Phase II), Peacekeeper Facilities, Cheyenne, Wyoming Area.

#### 2.2.3.1.3 Analytic Methods

The approach employed in this study is to evaluate two fundamental relationships:

- o The effect of the areal geology (physiography, stratigraphy, and structure) on the project; and

- o The effect of the project on the geologic resources pertinent to environmental concerns.

The first of these requires more than building a data base; it is essentially a search for broad-scale geologic aspects and an assessment of those aspects and how they relate to the project.

The second relationship pertains to the potential short and long-term impacts of project development on the geologic environment. Specific impacts usually fall within the categories of geologic hazards, soil erosion, etc., because little overall impact can be identified from project activities relative to physiography, stratigraphy, or structure within any reasonable time frame.

The steps used in gathering and analyzing the geologic data are part of a routine procedure frequently applied to geoenvironmental studies:

- o Initial data gathering and preliminary assessment of geologic characteristics;
- o Developing criteria for the important geologic characteristics and identifying the most sensitive issues;
- o In-depth gathering of published and unpublished data and obtaining interviews with knowledgeable local experts;
- o Data reduction to maps, overlays, tables, and matrices; and
- o Analysis and prioritization of the most sensitive issues.

### 2.2.3.2 Existing Conditions

#### 2.2.3.2.1 Geologic Hazards

Potential geologic hazards which were evaluated in the Region of Influence consisted of regional seismicity, faulting, ground subsidence, landslides, and liquefaction.

Geologic conditions in the Region of Influence were determined based on scientific literature and maps, previous Peacekeeper Closely Spaced Basing studies, and communication with local experts. Based on these data, geologic hazards are not considered resources for impact by the project. The potential impact, or the effects of the areal geology on the project are classified as safety issues and are presented in Section 1.6.10.4.3.

##### 2.2.3.2.1.1 Regional Seismicity

Earthquake magnitude is expressed using three scales in this report. A local Richter magnitude ( $M_L$ ) is a measure of the total energy released by an earthquake (within 100 kilometers of the epicenter), expressed on an open-ended, logarithmic scale. The largest known magnitudes worldwide are about 8.9. The  $M_L$  scale is most often used in conjunction with damage or design accelerations. A body wave magnitude ( $m_b$ ) is determined at large distances from the epicenter using the logarithm of the ratio of amplitude to period of the body waves. There is no universally accepted way to convert magnitudes reported on one scale to another. However, for the events reported for the vicinity of the Region of Influence,  $M_L$  values averaged 0.7 units lower than  $m_b$  values. Modified Mercalli Intensity (MMI) is a numerical index describing the effects of an earthquake on the earth's surface, on man, and

on structures. MMI values range from I (not felt or only rarely felt) to XII (total destruction). An MMI of V represents very slight damage to conventional structures which are not designed or constructed to resist earthquakes.

A plot of recorded earthquakes within about 250 miles of F.E. Warren AFB is shown in Figure 2.2.3-2. Few natural earthquakes (i.e., not induced) above the micro-earthquake level (magnitude  $[M] = 3$ ) have been reported in the vicinity of the Deployment Area. National Earthquake Information Service data show only three earthquakes within the Region of Influence (Figure 2.2.3-2). The largest recorded earthquake (MMI = V) within the Region of Influence occurred about 50 miles northwest of Cheyenne in Albany County near the western boundary of the Region of Influence. A second event of magnitude MMI = IV to V occurred in Scotts Bluff County about 80 miles northeast of Cheyenne. The third event of unknown magnitude occurred about 17 miles southwest of Cheyenne. The largest earthquakes within about a 180-mile radius of the Region of Influence have magnitudes of  $m_b = 5.1$  to 6. Five events in the 5.1 to 6 ( $m_b$ ) range are associated with the Rocky Mountain Arsenal Earthquake Swarm. Another event with  $m_b = 5.1$  to 6 has been reported near the South Dakota-Nebraska state line about 250 miles northeast of Cheyenne. Additionally, an MMI = VII event occurred near Casper, Wyoming.

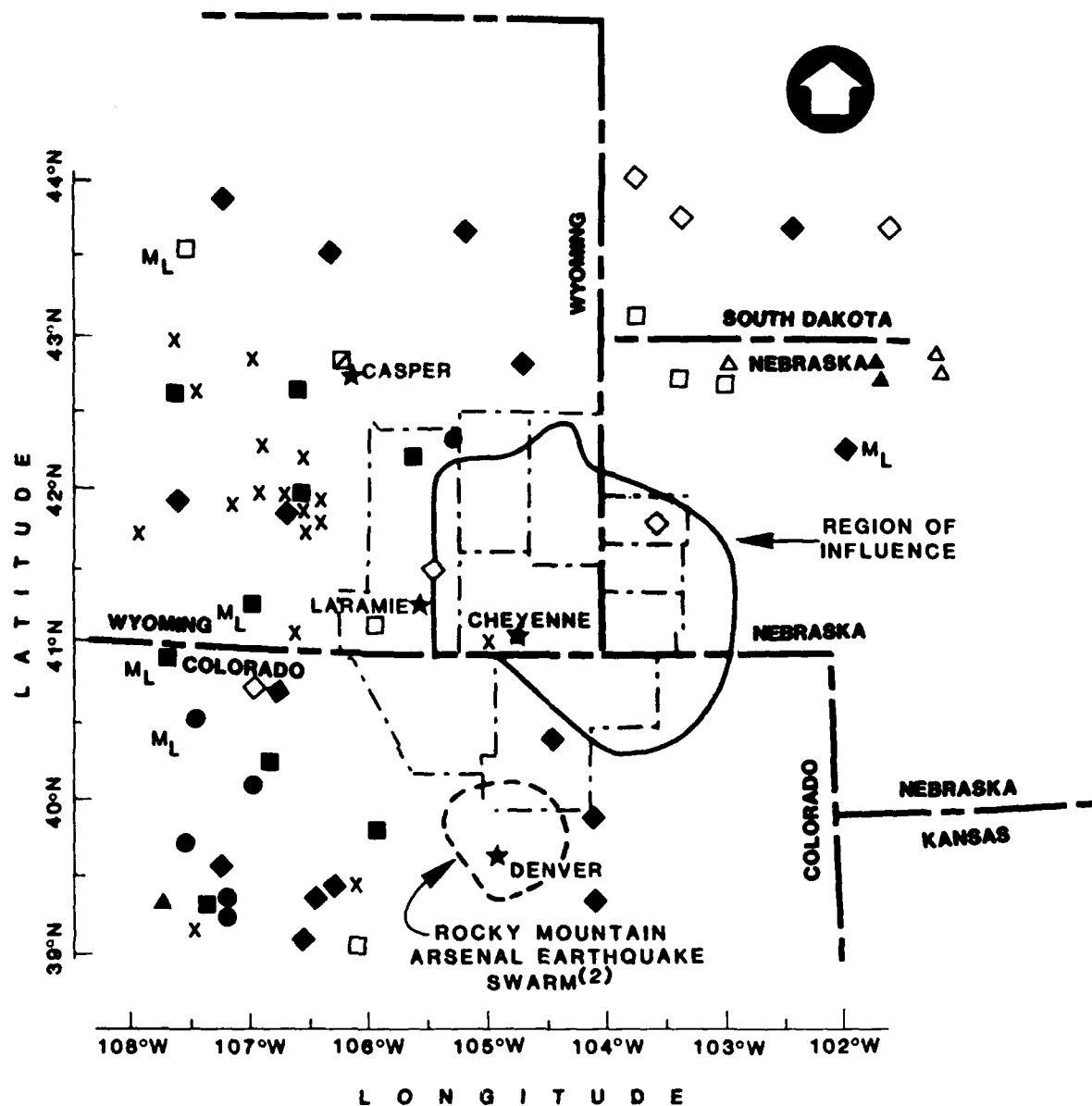
Small instrumentally recorded earthquakes ( $M_L=3$  or less) are typically not listed in the National Earthquake Information Service. Such shocks may be felt at the epicenter but would be well below the damage-causing threshold. Not all seismicity has been reported in the National Earthquake Information Service; small earthquakes in the range of Intensity III to VI have been reported in western Nebraska (Reagor et al. 1981, Figure 2.2.3-2) near the Chadron Arch. Although the numbers are sparse and magnitudes of these events are typically low, a general southeast trend of several events has led some researchers to speculate an association with the Chadron Arch.

In summary, based on the historic record, seismic activity in the Deployment Area is very low. Algermissen and Perkins (1976) and Algermissen et al. (1982) indicate that the 475-year return period (10 percent chance of exceeding in 50 years) design acceleration would be about 0.04g for the Cheyenne area. A similar study for the Rocky Mountain states by Liu and De Capua (1975) indicates a design value of about 0.02g for a 200-year period. These studies are based on historic seismicity distributed over judgmentally determined seismic source zones usually corresponding to physiographic or seismotectonic provinces.

#### 2.2.3.2.1.2 Faulting

The results of a detailed faulting evaluation in and beyond the Region of Influence for geologic resources suggests the geological area of main concern for the project is the Wheatland-Whalen Fault System. Other faults, detailed in the final Geologic Resources EPTR, are considered to pose no problem to the Peacekeeper project. Therefore, only a summary of the Wheatland-Whalen Fault System is presented in the FEIS.

The Wheatland-Whalen Fault System has been classified as active based on a USGS field study of a single exposure at Brush Creek, using two radiometric age dates to establish the last age of fault movement (McGrew 1962, Figure 2.2.3-3). Currently there are no universally accepted definitions for active and inactive faults (Slemmons and McKinney 1977). Definitions of active faults vary from those with very long recurrence intervals (500,000 years) to those with only historic surface displacement (about 200 years in the western United States). Faults may be dormant for hundreds and perhaps even thousands of years and then suddenly generate earthquakes; thus, most Quaternary faults have some potential for movement (Allen 1975).



NOTES:

1. Magnitudes are body wave magnitudes ( $m_b$ ) unless otherwise noted.
2. For clarity, not all earthquakes around Denver are shown. Earthquake distribution associated with the Rocky Mountain Arsenal Swarm is as follows:

MAGNITUDE RANGE	NUMBER OF EARTHQUAKES
2.1 - 3.0	6
3.1 - 4.0	4
4.1 - 5.0	29
5.1 - 6.0	5

REFERENCES:

1. NEIS 1982, 1983.
2. Reagor et al 1981.
3. Burchett, R.R. 1979.

Scale in Miles  
0 40 80

LEGEND

Body Wave Magnitude

- 2.1-3
- 3.1-4
- ◆ 4.1-5
- ▲ 5.1-6
- X Unknown

Modified Mercalli Intensity

- < III
- III or IV
- ◇ V
- △ VI
- ⊠ VII

FIGURE 2.2.3-2 EARTHQUAKES AROUND CHEYENNE, WYOMING THROUGH AUGUST 1983 (101° TO 108° W. LATITUDE AND 39° TO 44° N. LONGITUDE)



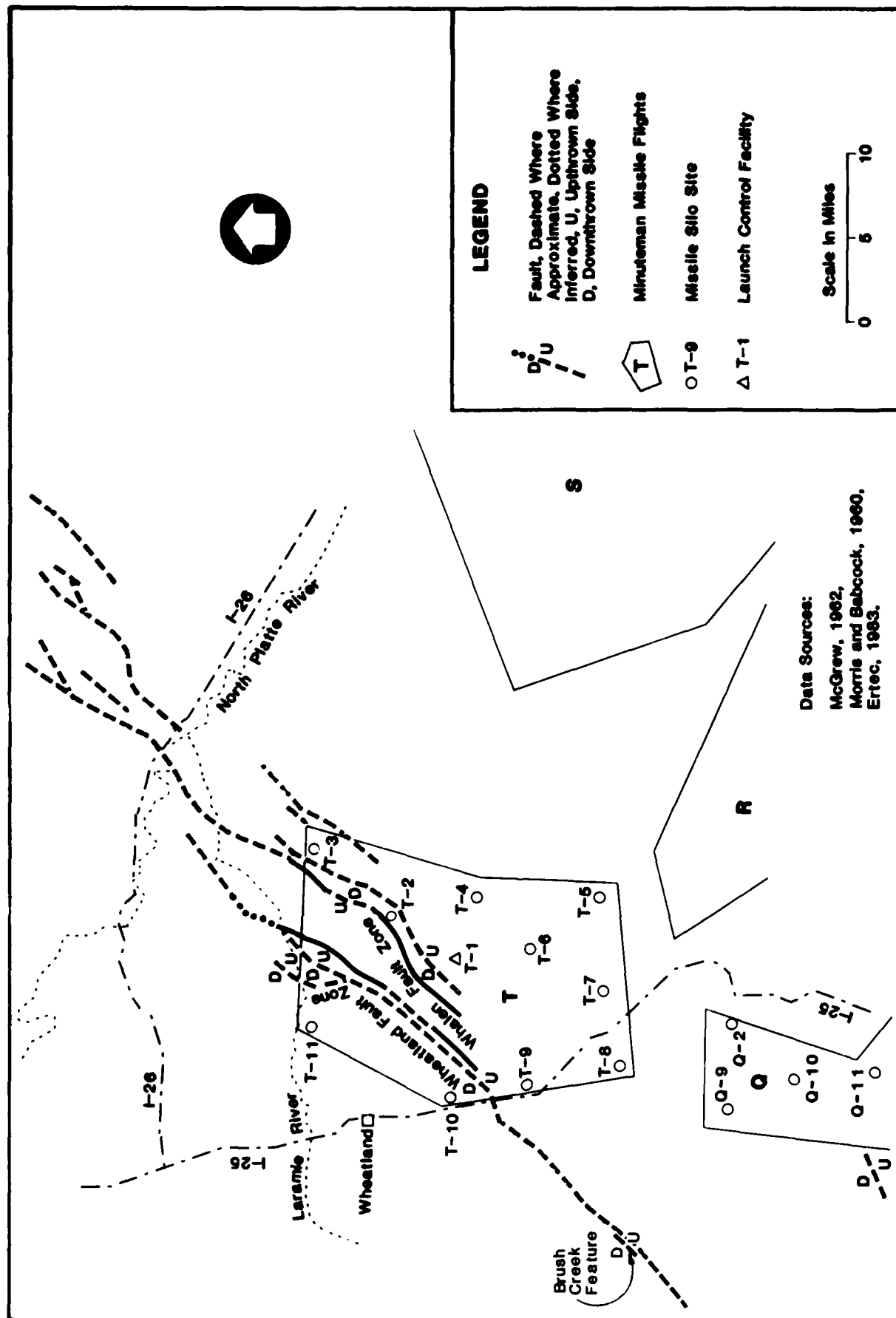


FIGURE 2.2.3-3 LOCATION OF THE WHEATLAND-WHALEN FAULT SYSTEM IN RELATION TO FLIGHT T

For this study, faults with historic surface rupture or associated seismicity and faults with geologic and/or geomorphic evidence of Holocene (past 10,000 years) movement are considered active.

Most of the displacement along the Wheatland-Whalen Fault System is interpreted to have occurred in latest Miocene and Pliocene time (McGrew 1962), but some displacement may have continued into Quaternary time. A small feature (the Brush Creek feature) of possible fault origin adjacent to the Wheatland fault is reported to have offset strata dated from  $9,500 \pm 400$  years to about 1,520 years (McGrew 1962). These data suggest the Brush Creek feature, and, by association, the Wheatland-Whalen Fault System, is an active fault based on the definition of an active fault being used in this report. However, evidence also exists that suggests the Wheatland-Whalen Fault System is not active. This evidence includes 1) the present morphological expression of the Wheatland and Whalen fault scarps; 2) the possibility that the dated feature at Brush Creek may be a localized landslide or other nontectonic feature, and 3) the fact that the overall degree of reported observations on the Brush Creek feature (e.g., 10 foot wide gouge zone and about 20 feet of displacement) is indicative of a major surface rupture, not a geographically small feature as identified at Brush Creek. Although there are data to suggest the Wheatland-Whalen Fault System is not active, these data are inconclusive and therefore, for the purpose of this study, the fault system is conservatively being considered active.

The trace of the Wheatland-Whalen Fault System trends northeast through Flight T; Launch Facilities T-2 and T-3 lie within the fault system and T-9 lies along its projection to the southwest. If tectonic movement occurs on the fault system, there will be potential for ground rupture in the area.

#### 2.2.3.2.2 Energy and Mineral Resources

This study evaluated the project impact on a number of energy and mineral resources: oil, gas, uranium, aggregate, coal, base and precious metals, and geothermal. With the exception of aggregate, the energy and mineral resources within the Region of Influence were not affected by the project for one or more of the following reasons: they are not known to exist within the Region of Influence or, if they exist, are in uneconomic quantities; they are already being produced and successfully coexist in the current Deployment Area configuration; and they are capable of being produced with little or no loss due to the project. Aggregate in the Region of Influence is an abundant resource.

Aggregate must meet established standards of abrasion resistance, chemical compatibility, and soundness to be suitable for use in concrete. The requisite characteristics of aggregates for use in roadbeds are less rigorous, but resistance to abrasion is nevertheless important.

Aggregate materials occur in a variety of environments throughout the Region of Influence including:

- o Sand and gravel associated with stream channels and terraces;
- o Sand and gravel in outcrops of the Ogallala Formation;
- o Sand and gravel in outcrops of other poorly consolidated sedimentary units, typically along the Laramie Range; and
- o Crystalline rocks suitable for crushing which include granite and metamorphic rocks found in the core of the Laramie Range, and the upturned limestone and dolomite beds flanking the core.

It is also possible that many upland areas between drainages are composed of aggregate suitable for project use. However, based on the available data, it is not possible to predict their distribution with any accuracy.

Current aggregate production in the region is largely on an as-needed basis and comes from several sand and gravel pit operations and limestone/dolomite/granite quarries. Limestone and granite quarrying operations near Granite, Wyoming, as well as limestone/dolomite production near Horse Creek and Guernsey, Wyoming and Laporte, Colorado are major sources of crushed rock aggregate in the region. Based on interviews with 14 major sand and gravel producers in and adjacent to the Region of Influence, there are approximately 175 million tons available for production. Crushed rock producers identified reserves of approximately 212 million tons.

#### **2.2.3.2.3      Soil Resources**

Agricultural and erosional characteristics of soils in the Region of Influence were assessed based on land capability classes (SCS 1975), application of the Wind Erosion Equation (SCS 1982), and application of the Universal Soil Loss Equation (SCS 1975).

The SCS defines eight land capability classes ranging from Class I soils which have slight limitations on usage as compared to Class VIII soils which have limitations that nearly preclude their use for commercial crop production. For a detailed listing of the eight classes refer to USDA (1975). The limitations can take any of several typical forms such as shallowness, droughtiness, climate, and erosiveness. In areas where sufficient data for such an evaluation exist, the predominant limitation for soil in the Areas of Concentrated Study is susceptibility to erosion.

Eastern Wyoming has no Class I soils in the survey area and the most prominent soil series range from Class III to VII (nonirrigated) to Class II to VI (irrigated). Many of the soils are considered suitable for dry land wheat farming and, when irrigated, are suitable for a variety of other crops also. All soils in the area generally support native grasses which provide a feed source for cattle and sheep.

The soils of western Nebraska in the vicinity of the Deployment Area are primarily Class III soils which have a potential for Class I if irrigated. Nearly all the soils in the survey area are cropped in wheat. The main limitation to these soils is susceptibility to erosion and lack of natural moisture.

General soil characteristics in the vicinity of F.E. Warren AFB indicate that the dominant classes are II through VI and that the primary limitation is susceptibility to erosion. There are no data available to suggest the presence of Class I soils in the area and some Class III soils may have the potential to be Class II soils if irrigated.

The baseline soil erosion rates for eastern Wyoming and western Nebraska were estimated on a generic basis by application of the Universal Soil Loss Equation and the Wind Erosion Equation (SCS 1982). The application of these equations yielded baseline values of 0.02 tons per acre per year (T/acre/yr) for water erosion and 5.2 T/acre/yr for wind erosion in eastern Wyoming. Estimates from an identical analysis for the soils in western Nebraska are 0.02 T/acre/yr for baseline water erosion and 4.1 T/acre/yr for baseline wind erosion.

## **2.2.4      Noise**

Noise is defined as any sound (i.e., rapid change of air pressure waves) considered to be undesirable. The noise sources evaluated for this EIS are vehicular, air, and railroad transportation, plus construction activity. The information in this section is based upon data and detailed analysis contained in the Noise Environmental Planning Technical Report.

### **2.2.4.1      Region of Influence, Data Sources, and Analytic Methods**

#### **2.2.4.1.1      Region of Influence**

The Region of Influence for noise is broadly defined as that part of the project area in which noise level increases can potentially occur. These locations include project construction sites at F.E. Warren AFB; affected silos, access roads, and cable trench paths within the Deployment Area; interstate highways; and principal traffic arterials. Figure 2.2.4-1 presents the Region of Influence for noise.

The Area of Concentrated Study within the Region of Influence includes F.E. Warren AFB; Cheyenne, Wheatland, and Chugwater, Wyoming; Kimball, Nebraska; areas where existing noise levels are high; and areas projected to be impacted by future trends or project-related noise sources. A more detailed description and justification for the Area of Concentrated Study is provided in Section 3.2.4.1.

The U.S. Environmental Protection Agency (EPA) and Federal Highway Administration have defined noise level increase limits from vehicular traffic in residential areas and noise-sensitive areas, such as around nursing homes, schools, hospitals, churches, and other areas where the preservation of reduced noise levels is important. These noise level limitations are described in terms of 65- $L_{eq}$  values. The Federal Aviation Administration (FAA) has developed recommendations for noise standards for airport operations at airport boundaries of 65  $L_{dn}$ . Specific noise standards for railroads have not been promulgated; however, for purposes of this study, noise from railroad operations is compared to EPA 65- $L_{dn}$  standards, since these standards were designed to minimize intrusive residential noise levels. The 65- $L_{dn}$  and 65- $L_{eq}$  noise levels are accepted and recognized values used for determination of environmental noise impacts on human receptors. For purposes of comparing various existing and predicted noise level indices, it should be noted that, for peak-traffic periods, the  $L_{eq}$  is approximately equivalent to the  $L_{dn}$  (U.S. Department of Housing and Urban Development 1979).

#### **2.2.4.1.2      Data Sources**

Information and data relevant to all aspects of the noise analysis were acquired from the following sources: EPA, Federal Highway Administration, U.S. Department of Housing and Urban Development, FAA, Wyoming Department of Environmental Quality, Wyoming State Highway Department, Nebraska Department of Environmental Control, Nebraska Department of Health, Nebraska Department of Roads, Colorado Department of Health, City of Cheyenne, Cheyenne Airport, Union Pacific Railroad, Wyle Laboratories, and Bolt, Beranek and Newman, Inc.

To determine existing noise levels in the project area, ambient noise levels were monitored in the vicinity of the Cheyenne Airport and railroad station yard, and at traffic arterials and intersections in Cheyenne, Wheatland, Kimball, and in the Deployment Area.

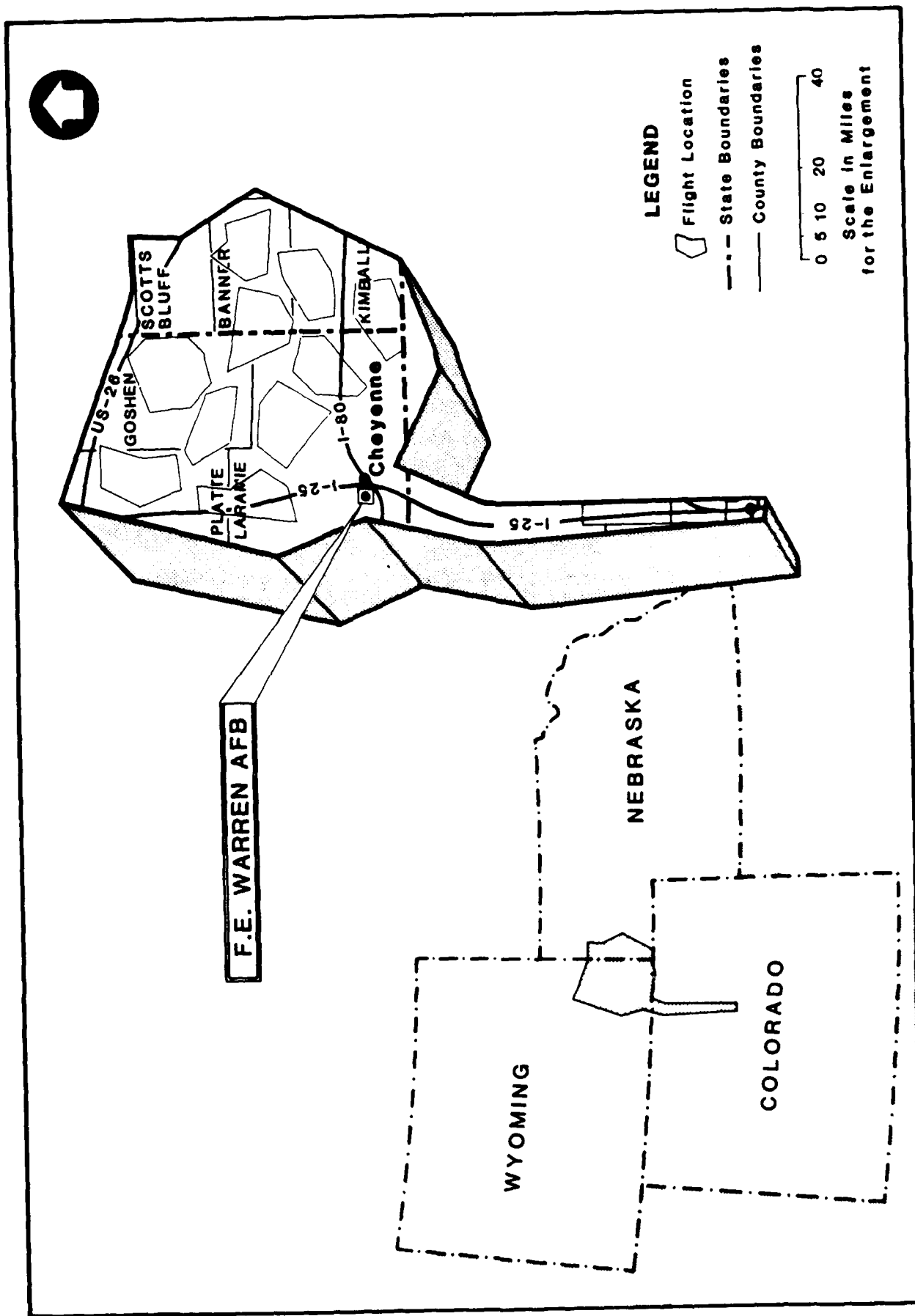


FIGURE 2.2.4-1 REGION OF INFLUENCE FOR NOISE

#### 2.2.4.1.3 Analytic Methods

Vehicular Noise. The Federal Highway Administration's STAMINA 2.0 computerized noise model was used to predict existing noise levels resulting from motor vehicle operation (Federal Highway Administration 1982). This EPA-accepted model predicts noise levels from light-duty vehicles (autos and light trucks), medium-duty vehicles (two-axle, six-tire trucks), and heavy-duty vehicles (trucks with more than two axles).

STAMINA 2.0 incorporates data on vehicle volumes, vehicle speeds, and the physical characteristics of the roadway and surrounding environment in calculating noise level values. Calculations for roadway grade, reflective and absorptive barriers, ground cover, and adjustments for noise levels as they may vary over distances are also components of this model. The primary data collected as part of the ambient noise monitoring program were used to calibrate the STAMINA 2.0 model prior to prediction of roadway noise levels. Calibration serves as a check to assure proper and accurate simulation modeling of the roadway geometries and site topography. This type of calibration was used with the STAMINA 2.0 model by comparing predicted output with actual noise values monitored in the project area.

Air Traffic Noise. The only major airport in the project area is Cheyenne Airport. Existing noise levels for Cheyenne Airport were preliminarily screened and evaluated using an FAA airport noise exposure contouring procedure developed by Bolt, Beranek and Newman, Inc. in 1975 and updated in 1982 (Bolt, Beranek and Newman, Inc. 1975). This procedure bases determination of airport noise on total operations of jet and propeller aircraft, exclusive of helicopters, during an annual period. Use of this procedure enabled  $L_{dn}$  noise level contours to be developed, which were in turn overlaid onto an aerial map of the airport.

Railroad Noise. The only major railroad station in the project area is located in Cheyenne. The procedure used to estimate the  $L_{dn}$  noise contours in the vicinity of the railroad yard was developed by Wyle Laboratories for use by railroad companies (Wyle Laboratories 1973). Separate sets of noise contours were derived from mainline operations and yard operations. Calculations for noise due to mainline operations take into account train length, train speed, number of trains per day, use of helper engines, and the proportion of operations taking place at night.

Noise contours for yard operations account for hump yard classifications, flat yard switching, engine repair, mechanical refrigerator car servicing, and areas for train arrival, makeup, and departure. These activities are assigned to known noise centers within the yard.

Construction Noise. Standard references were reviewed to define noise levels generated by various types of construction activities and various categories of construction equipment (EPA 1971).

#### 2.2.4.2 Existing Conditions

##### 2.2.4.2.1 Vehicular Noise

Noise associated with road traffic is considered to be relatively constant. It varies in this respect from the intermittent peak-noise levels from air and rail traffic. Road traffic noise is also a much more widespread source, and to some extent affects every environment. Actual levels of highway-generated noise will vary with traffic conditions, road design, physical surroundings, weather conditions, and particular vehicle types. Automobiles are usually a relatively minor source of roadside noise. In contrast, heavy trucks and buses are generally

the primary contributors to the noise levels. Exhaust, engine, and tire noise are the sources of the high levels associated with heavy vehicles. This problem is compounded whenever these vehicles are carrying a heavy load, traveling uphill, or accelerating from a stopped position.

The monitored noise level data were used to calibrate the STAMINA 2.0 model, which in turn was used to predict existing noise levels from motor vehicles. Calculated 1983 noise levels for key roadway segments are shown in Table 2.2.4 -1 for varying distances from the roadway right-of-way boundary and are reported as equivalent level ( $L_{eq}$ ) values.

The analysis indicates that approximately 37 dwelling units in Cheyenne along Interstate 25 (between Central Avenue and Pershing Boulevard) with an estimated population of 93 people; and 36 dwelling units along 16th Street and 100 units on South Street in Wheatland, with an estimated population of 90 and 250 people, respectively, fall within the 65- $L_{eq}$  noise level contour which extends beyond the right-of-way of these roads.

#### 2.2.4.2.2 Air Traffic Noise

Noise levels for Cheyenne Airport were estimated using the FAA airport noise contouring procedure. Annual operations data were estimated for 1983 on the basis of historical records and information provided by the Cheyenne Airport Manager. The 1983 65- $L_{dn}$  noise level contour was calculated and superimposed over the Cheyenne Airport. The analysis indicates that about 262 dwelling units (south, east, and northwest of the airport) with an estimated population of 655 people, fall within the calculated 65- $L_{dn}$  noise level contour which extends beyond the airport boundary.

#### 2.2.4.2.3 Railroad Noise

Noise level determination associated with railroad operations in Cheyenne was based upon both yard and mainline operations. However, the noise centers associated with the yard operations dominate the size and location of the noise contours. Railroad operations in Cheyenne consist of a maximum 600 cars per day processed at the railroad yard with peak activity occurring between 7:00 AM and 3:00 PM.

Yard operations consist entirely of flat yard switching, with most switching activities occurring on tracks south of the train tower concentrated in an area approximately 1,000 feet west of and 1,600 feet east of the Interstate 180 viaduct. The locomotive servicing, repair, and self-load testing activities adjacent to the turntable constitute another major noise center.

The results of the Wyle Laboratories analytical procedure indicates that about 61 dwelling units (south of the railroad yard) with an estimated population of 153 people, fall within the calculated 65- $L_{dn}$  noise level contour which extends beyond the railroad boundary.

#### 2.2.4.2.4 Construction Noise

A range of construction activity is presently occurring within the city of Cheyenne and throughout the project area. These activities include roadway upgrading, residential and commercial construction, and topside grading and excavation for irrigation. The noise levels resulting from these activities are dependent upon such factors as type and number of construction vehicles employed, physical location of the construction site, contractor specifications, and requirements and overall adherence to state and local construction noise ordinances.

Table 2.2.4-1  
CALCULATED NOISE LEVELS AT  
SELECTED RECEPTORS FOR 1983

Roadway Segments	Right-of-Way Boundary (Leq)	Distance From Right-of-Way Line	
		100 Ft (Leq)	200 Ft (Leq)
<u>Cheyenne, Wyoming</u>			
Interstate 25 (Four Mile Road to Central Avenue)	65.1	61.9	59.7
Interstate 25 (Central Avenue to Pershing Boulevard)	68.4	65.2	63.0
Interstate 25 (Pershing Boulevard to Missile Drive)	68.4	65.2	63.0
Interstate 25 (Missile Drive to Interstate 80)	67.1	63.8	61.7
Interstate 25 (Interstate 80 to College Drive)	67.4	64.0	61.5
Prairie Avenue (Yellowstone Road to Dell Range Boulevard)	66.2	57.8	54.1
Dell Range Boulevard (Prairie Avenue to Powder House Road)	62.9	57.0	54.1
Central Avenue (Interstate 25 to Yellowstone Road)	65.4	58.1	54.6
Central Avenue (Yellowstone Road to Warren Avenue)	67.1	59.8	56.3
Central Avenue (Warren Avenue to Pershing Boulevard)	63.6	56.3	52.8
Warren Avenue (Central Avenue to Pershing Boulevard)	63.6	56.3	52.8
Pershing Boulevard (Interstate 25 to Snyder Avenue)	63.0	55.7	52.2



Table 2.2.4-1, Continued, page 2 of 3  
CALCULATED NOISE LEVELS AT SELECTED RECEPTORS

Roadway Segments	Right-of-Way Boundary (Leq)	Distance From Right-of-Way Line	
		100 Ft (Leq)	200 Ft (Leq)
Pershing Boulevard (Snyder Avenue to Central Avenue)	63.8	56.5	53.0
Pershing Boulevard (Central Avenue to Warren Avenue)	64.6	57.3	53.8
Pershing Boulevard (Evans Avenue to Morrie Avenue)	66.9	59.7	56.2
Pershing Boulevard (Morrie Avenue to Logan Avenue)	66.2	59.0	55.5
Pershing Boulevard (Logan Avenue to Converse Avenue)	65.4	58.1	54.6
Pershing Boulevard (Converse Avenue to Windmill Road)	66.1	58.8	55.3
Pershing Boulevard (Ridge Road to U.S. 30)	62.5	55.2	51.7
Interstate 80 (Interstate 25 to College Drive)	65.0	62.3	60.4
College Drive (Interstate 25 to Railroad Tracks)	63.1	55.8	52.3
College Drive (Railroad Tracks to Parsley Boulevard)	64.1	54.2	51.9
College Drive (Parsley Boulevard to Walterscheid Boulevard)	65.0	57.4	53.9
College Drive (Walterscheid Boulevard to U.S. 85)	64.2	56.9	53.4
Fox Farm Road (U.S. 85 to Avenue C)	63.8	56.3	52.8
Fox Farm Road (Avenue C to College Drive)	63.1	55.8	52.3

Table 2.2.4-1, Continued, page 3 of 3  
CALCULATED NOISE LEVELS AT SELECTED RECEPTORS

Roadway Segments	Right-of-Way Boundary (Leq)	Distance From Right-of-Way Line	
		100 Ft (Leq)	200 Ft (Leq)
Windmill Road (Dell Range Boulevard to Pershing Boulevard)	65.1	57.0	54.4
Ridge Road (Four Mile Road to Dell Range Boulevard)	64.8	57.6	54.1
Lincolnway (Pershing Boulevard to Ridge Road)	60.0	57.0	54.9
Lincolnway (Logan Avenue to Morrie Avenue)	64.4	61.4	59.3
Parsley Boulevard (Interstate 80 to Ames Avenue)	60.4	53.1	49.6
Missile Drive (Interstate 25 to 20th Street)	61.4	54.9	51.7
Evans Avenue (8th Avenue to Pershing Boulevard)	64.8	56.7	53.3
Ames Avenue (Parsley Boulevard to 20th Street)	64.5	57.3	53.8
20th Street (Logan Avenue to Morrie Avenue)	62.0	54.8	51.3
20th Street (Snyder Avenue to Ames Avenue)	60.4	53.1	49.6
<u>Kimball, Nebraska</u>			
U.S. 30	66.6	59.4	55.9
Route 71	64.4	57.1	53.6
<u>Wheatland, Wyoming</u>			
16th Street	69.4	59.4	58.6
South Street	70.8	63.5	60.0

**Because of this variability, noise levels resulting from existing general construction activity have not been quantified, but are most probably within noise level ranges typical for general construction activity.**

## **2.2.5      Air Quality**

Air quality is defined as a descriptive measure of the cumulative quantity of pollution in the air. The term air quality refers to the condition of the atmosphere due to emissions from natural and manmade sources and is typically measured with respect to health and visibility implications. Selected air pollutants were analytically evaluated, based on expected increases in emission quantities for the level of activity associated with this project. These included carbon monoxide (CO), resulting primarily from transportation (mobile) sources, and fugitive dust, resulting primarily from such activities as vehicular travel on unpaved surfaces, overburden disturbances, and erosion. The impact of air pollution on regional visibility has also been evaluated. The information in this section is based upon data and detailed analysis contained in the Air Quality Environmental Planning Technical Report.

### **2.2.5.1      Region of Influence, Data Sources, and Analytic Methods**

#### **2.2.5.1.1      Region of Influence**

The Region of Influence for air quality includes those surrounding areas in which air quality may be affected directly (by construction activities) or indirectly (by project-induced transportation traffic and housing development). It centers on F.E. Warren AFB, the city of Cheyenne, interstate highways, principal traffic arterials, and affected silos, access roads, and cable trench paths within the Deployment Area. Outer boundaries of the Region of Influence were conservatively set at 50 miles from the pollution sources.

In addition, the Region of Influence includes federal and state-mandated areas of study, nearby nonattainment areas (Fort Collins and Greeley, Colorado), nearby federal Prevention of Significant Deterioration Class I areas (Rocky Mountain National Park and Rawah Wilderness, Colorado), and nearby state Category I areas (Savage Run Wilderness, Wyoming.) The total Region of Influence for air quality is presented in Figure 2.2.5-1.

The Area of Concentrated Study within the Region of Influence includes F.E. Warren AFB; Cheyenne, Wheatland, and Chugwater, Wyoming; Kimball, Nebraska; and areas where pollutant concentrations resulting from the Proposed Action exceed minimum threshold levels. A more detailed justification for the Area of Concentrated Study is provided in Section 3.2.5.1.

The Region of Influence is based upon EPA minimum levels for air quality impacts (Federal Register 1978). The source of air pollution is defined as the "envelope" containing all of the sites of construction activity and the principal traffic routes.

The Region of Influence boundary is determined for each analyzed pollutant. It is defined as the distance from any point on the circumference of that pollution source envelope, equivalent to the maximum distance from a pollution source to a location at which minimum threshold increment concentrations are indicated (EPA Area of Impact criteria) (EPA 1980a). This distance is predicted by dispersion modeling.

Study area classifications (nonattainment, Prevention of Significant Deterioration Class I, and Prevention of Significant Deterioration Category I) are determined by the EPA, the Wyoming Department of Environmental Quality, the Nebraska Department of Environmental Control, and the Colorado Department of Health. Nonattainment areas are those areas which have been designated as exceeding one or more of the ambient air quality standards. Mandatory Class I/Category I areas are those areas where practically no deterioration of air quality is allowed. These areas include international parks, national wilderness areas, and memorial parks larger than 5,000 acres, and national parks larger than 6,000 acres. Deterioration of air quality includes increases in atmospheric concentrations of pollutants and impairment of

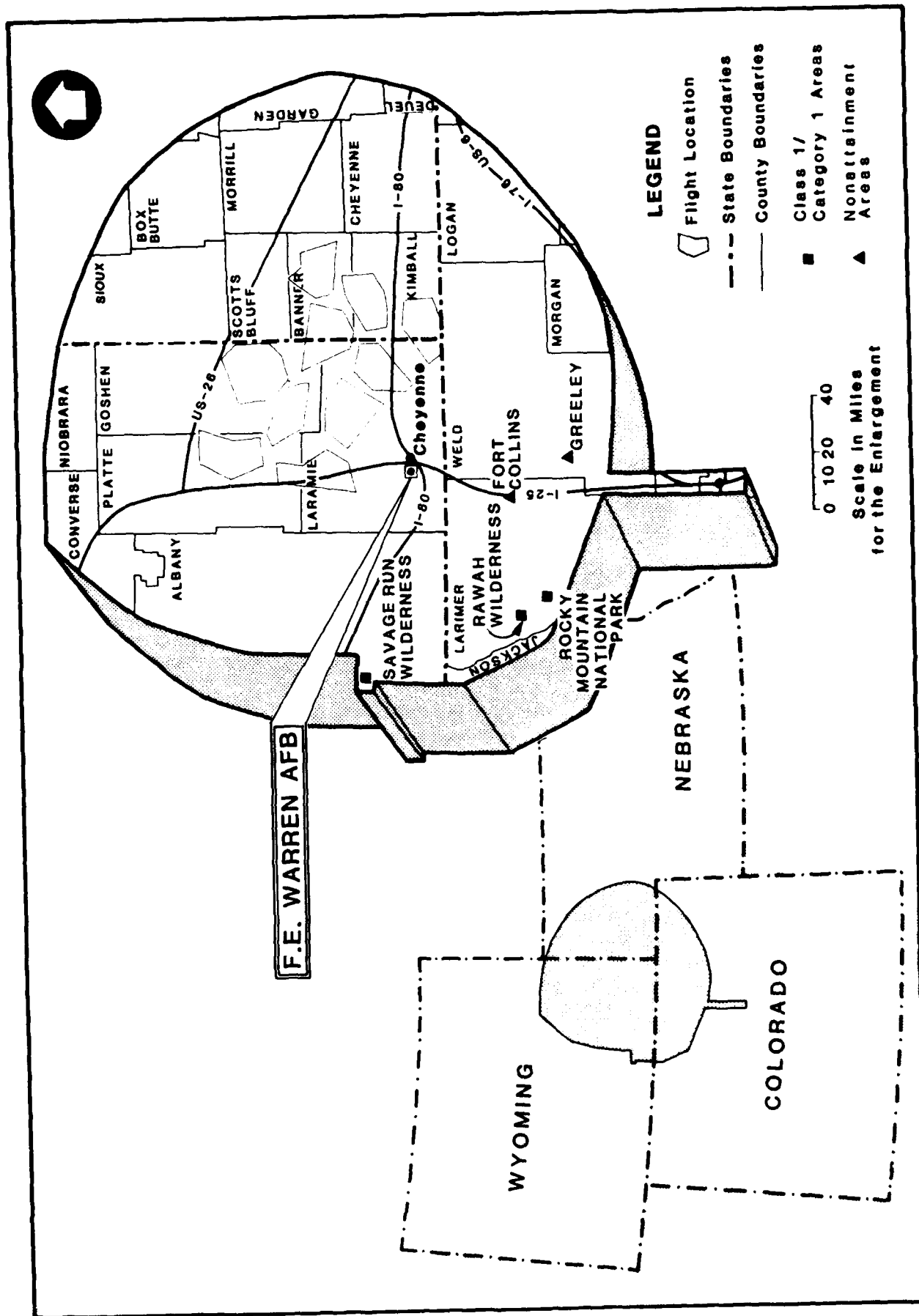


FIGURE 2.2.5-1 REGION OF INFLUENCE FOR AIR QUALITY

visibility within a reasonable distance from the source(s) of atmospheric emissions (Federal Register 1980, Wyoming Department of Environmental Quality 1982a, Nebraska Department of Environmental Control 1982a, Colorado Department of Health 1982a).

#### 2.2.5.1.2 Data Sources

Information and data relevant to all aspects of the air quality analysis have been acquired from the following sources: EPA, National Climatic Data Center, National Weather Service, U.S. Department of Agriculture, U.S. Department of the Interior, Federal Highway Administration, Wyoming Department of Environmental Quality, Wyoming State Highway Department, Nebraska Department of Environmental Control, Nebraska Department of Roads, Colorado Department of Health, City of Cheyenne, and Midwest Research Institute.

#### 2.2.5.1.3 Analytic Methods

**Carbon Monoxide.** CO is the primary pollutant associated with transportation sources and, hence, tends to be a unique problem for urban areas. In order to determine vehicular CO concentrations on selected roadway segments and intersections, the EPA mobile source emissions program, MOBILE 2 (EPA 1981a), was used in conjunction with the CALINE 3 dispersion model (Federal Highway Administration 1979).

MOBILE 2 was used to determine composite vehicular emission source strengths for CO. Specific vehicular mixes (i.e., percentages of light-duty gas/diesel cars and trucks, medium-duty gas/diesel trucks and heavy-duty gas/diesel trucks), percent hot/cold start operations, inspection/ maintenance criteria, and ambient temperature were incorporated into the program. This model is an accepted EPA procedure for emissions development.

CALINE 3 is a Gaussian diffusion program used for the estimation of CO concentrations from line (i.e., roadway) sources. The model incorporates vehicular emission factors from MOBILE 2, vehicular volumes, meteorological parameters (i.e., wind speed and direction and atmospheric stability class), and roadway configuration (based upon a Cartesian coordinate system) to estimate 1 and 8-hour CO concentrations for selected signed or signaled intersections (interrupted flow) and freely flowing roadway segments (uninterrupted flow). This model is an accepted EPA procedure for dispersion analysis.

Sensitivity tests were performed for the selected intersections and roadway segments in the project area where high volumes of traffic and/or increases in volumes were anticipated in order to determine the wind angle which would produce maximum CO levels at the designated receptor locations. Receptors were located along the roadway rights-of-way to determine maximum CO levels associated with human exposure. Roadways were modeled as infinite links to include impacts at the theoretical receptors from distant sources. Highway links were set at 2 miles in length, since sensitivity tests indicated that vehicular sources beyond 2 miles had no impact at the receptors. The assigned link lengths for residential roadways were slightly longer than the actual link lengths to approximate the impact of vehicular emissions along adjacent roadway links.

**Fugitive Dust.** In the Region of Influence, fugitive dust emissions comprise the largest component of total suspended particulates. Fugitive dust results from natural or manmade particulate matter which becomes airborne due to forces of wind, man's activity, or both. Existing levels of total suspended particulates were determined from monitored data collected by the Wyoming Department of Environmental Quality and Nebraska Department of Environmental Control. Monitored measurements of total suspended particulates at representative rural sites were used to define existing levels of fugitive dust concentrations in the Deployment Area.

**Visibility.** Existing levels of regional visibility were based on visual range distances determined from review of existing documentation.

#### **2.2.5.2     Existing Conditions**

##### **2.2.5.2.1     Climatology/Meteorology**

This study utilizes surface meteorological data collected by the National Weather Service at the Cheyenne Airport and upper air meteorological data collected in Denver. These data are considered representative of the project area.

The climate in the vicinity of Cheyenne and the Deployment Area is influenced primarily by air masses moving in from the Pacific. The climate is distinctively semiarid since the mountain ranges to the west act as an effective moisture barrier. The mean annual precipitation, approximately 15 inches, occurs primarily between the months of March and October (U.S. Department of Commerce 1982).

The region experiences large diurnal and annual temperature ranges. The daily range averages about 30°F in the summer and 23°F in the winter. The monthly mean temperature ranges from about 69°F in July to about 27°F in January. The area experiences about 10 days per year with maximum temperatures exceeding 90 °F and about 12 days per year with a minimum temperature of 0°F or below. The area is occasionally affected by warm Chinook winds blowing down the slopes of the Laramie Mountains 30 miles to the west of Cheyenne. This effect is most frequently noticeable during the winter months (U.S. Department of Commerce 1982).

The prevailing winds are from the west to west-northwest. Average surface wind speeds are quite high, averaging about 13 miles per hour (mph). Windy days are particularly frequent in the winter and spring months, when monthly mean wind speeds can exceed 15 mph. Minimum monthly average wind speeds of about 10.5 mph occur during July and August (U.S. Department of Commerce 1982).

The atmospheric dispersion potential in the area is usually good. The mean morning mixing depth, measured at 5:00 AM local standard time, is approximately 1,000 feet and the mean afternoon mixing depth, calculated for 5:00 PM local standard time, is approximately 8,000 feet (Holzworth 1972). More recent data from the Wyoming Department of Environmental Quality indicate the mean afternoon mixing depth to be 6,600 feet; this value will be used in the subsequent air quality analysis. Surface-based inversions occur about 40 percent of the time, primarily during nighttime hours (Hosler 1961). The atmospheric stability is generally neutral to slightly stable 82 percent of the time (Wyoming Department of Environmental Quality 1983).

##### **2.2.5.2.2     Regional Emissions**

The latest annual (1980) regional air quality emission inventory, extracted from the EPA National Emission Data System, is provided in Table 2.2.5-1. Emission data were available for total suspended particulates, oxides of sulfur, oxides of nitrogen, CO, and volatile organic compounds, a measure of hydrocarbons.

Based on the air quality inventory, emissions of oxides of nitrogen, CO, and hydrocarbons are attributable primarily to transportation-related sources. Evaporation of petroleum products and solvents is an additional source of hydrocarbons. Electrical generation is an additional source of oxides of nitrogen. Emissions of oxides of sulfur are mostly from coal and oil combustion and petroleum industry processes. Total suspended particulate emissions occur primarily as fugitive dust resulting from vehicular traffic on unpaved roads. Existing major

point sources of air pollutants include the Husky Oil Refinery, the Wycon Chemical Fertilizer Plant, the Morrison-Knudsen Quarry, and the F.E. Warren AFB Central Heating Plant, which are all located in Laramie County, and the Laramie River Power Station in Platte County.

Table 2.2.5-1

REGIONAL AIR QUALITY INVENTORY-1980(T/yr)

County	Total Suspended Particulates	Oxides of Sulfur	Oxides of Nitrogen	Carbon Monoxide	Volatile Organic Compounds <sup>1</sup>
<b>Wyoming</b>					
Laramie	44,286	9,276	17,630	72,819	12,380
Platte	14,221	3,455	12,350	10,275	1,578
Goshen	14,498	1,490	4,569	14,767	2,322
<b>Nebraska</b>					
Kimball	11,378	43	530	5,226	741
Banner	5,153	11	147	1,298	163
Scotts Bluff	15,474	589	3,017	27,151	3,314

<sup>1</sup> Volatile organic compounds are a measure of reactive hydrocarbons.

Source: EPA Annual Report, National Emission Data System (EPA 1983).

2.2.5.2.3 Existing Air Quality

The project area lies within the Metropolitan Cheyenne and Nebraska Interstate Air Quality Control Regions (Code of Federal Regulations 1982). These regions are classified as attainment areas with respect to state and federal air quality standards. The closest nonattainment areas, Greeley and Fort Collins, Colorado, are approximately 50 miles south and 40 miles south-southwest, respectively, of Cheyenne, Wyoming as shown on Figure 2.2.5-1. Both Greeley and Fort Collins are designated nonattainment for the primary 8-hour CO standard and the secondary annual total suspended particulate standard (Colorado Department of Health 1982b). The closest Prevention of Significant Deterioration Class I areas, Rocky Mountain National Park and Rawah Wilderness (Colorado), are located approximately 60 miles southwest and south-southwest, respectively, from Cheyenne as shown on Figure 2.2.5-1. The closest state (Wyoming) Category I area, Savage Run Wilderness, is located approximately 80 miles west of Cheyenne as shown on Figure 2.2.5-1.

The project area currently experiences excellent air quality due to the following conditions favorable for atmospheric dispersion of air pollutants: neutral atmospheric stability, extensive mixing heights, high wind speed, and relatively few sources of air pollutants in the immediate area.

Based on 1982 air quality measurements in Cheyenne, the annual average concentration of sulfur dioxide was less than 1 microgram per cubic meter ( $\mu\text{g}/\text{m}^3$ ), which is almost negligible compared to the Wyoming Ambient Air Quality Standard of  $60 \mu\text{g}/\text{m}^3$ , and the



Nebraska and National Ambient Air Quality Standards of  $80 \mu\text{g}/\text{m}^3$ . The annual average nitrogen dioxide concentration was  $23 \mu\text{g}/\text{m}^3$ , compared to the National, Wyoming, and Nebraska Ambient Air Quality Standards of  $100 \mu\text{g}/\text{m}^3$ .

#### 2.2.5.2.3.1 Carbon Monoxide

Key roadway intersections and segments (corridors) in the project area were selected for evaluation on the basis of present and projected vehicular volumes. A total of 10 intersections and 16 roadway segments in the project area were modeled using CALINE 3. For both the intersection and roadway segment analysis, CO concentrations were predicted for adjacent receptors representing sidewalk locations on or near the edge of pavement. Intersections typically represent the locations of highest CO concentrations, since the relationship between vehicular speed and emissions of CO is such that CO emissions are greatest at low speeds and are maximized during deceleration, idling, and acceleration modes. These operational modes are characteristic of signed or signalized intersections.

Since no CO monitored data were available in the project area, CO background concentrations were determined through coordination with state environmental agencies. Background levels are defined as those residual levels of a pollutant that are present in the project area exclusive of the roadway(s) under study and are added to predicted levels in order to determine total CO concentrations. Values of 1.0 parts per million (ppm) for 1 hour and 0.5 ppm for 8 hours have been used in this report. These values were added to the respective 1 and 8-hour concentrations of CO predicted from the CALINE 3 modeling.

The results of the CALINE 3 roadway segment and intersection analysis for the base year, 1983, are provided in Table 2.2.5-2. No National, Wyoming, or Nebraska Ambient Air Quality Standards were shown to be either equaled or exceeded at any receptor.

#### 2.2.5.2.3.2 Fugitive Dust

Fugitive dust emissions are a major contributor to the total suspended particulates inventory and have been analyzed in this report since project-related construction activity will increase levels of airborne particulate matter. In this sense, fugitive dust emissions will be used as a measure of the total suspended particulate impacts of the project. The National, Wyoming, and Nebraska Ambient Air Quality Standards address primary and secondary standards of total suspended particulates. The annual (1980) inventory of fugitive dust is provided in Table 2.2.5-3.

The 1982 annual geometric mean total suspended particulate concentrations measured in Cheyenne, Wyoming and Scottsbluff, Nebraska were  $30$  and  $67 \mu\text{g}/\text{m}^3$ , respectively. The second highest recorded 24-hour total suspended particulate measurements were  $60$  and  $152 \mu\text{g}/\text{m}^3$  in Cheyenne and Scottsbluff, respectively. The rural annual geometric mean total suspended particulate concentration considered representative of the Deployment Area was  $17.5 \mu\text{g}/\text{m}^3$  (Wyoming Department of Environmental Quality 1982b, Nebraska Department of Environmental Control 1982b). It should be noted that the measured total suspended particulate concentrations probably include fugitive dust from agricultural activities and from natural windblown surfaces.

#### 2.2.5.2.3.3 Visibility

Visibility in the vicinity of the project area tends to be excellent. The annual frequency of windblown dust restricting visibility to less than 7 miles is 0.2 percent. These conditions occur most frequently during the spring months (Orgill and Sehmel 1975). The Wyoming Department

Table 2.2.5-2

**CALCULATED CARBON MONOXIDE CONCENTRATIONS  
AT SELECTED RECEPTOR LOCATIONS FOR 1983<sup>a</sup>**

<b>Roadway Configuration</b>	<b>1-Hour Concentration (ppm)</b>	<b>8-Hour Concentration (ppm)</b>
<b><u>Roadway Segments</u></b>		
<b><u>Cheyenne, Wyoming</u></b>		
Interstate 25 (Central Avenue to Pershing Boulevard)	2.6	0.9
Interstate 25 (Pershing Boulevard to Missile Drive)	2.2	0.8
Interstate 25 (Missile Drive to Interstate 80)	2.2	0.7
Interstate 25 (Interstate 80 to College Drive)	2.2	0.7
Interstate 80 (Interstate 25 to Interstate 180)	1.6	0.7
Interstate 80 (Interstate 180 to College Drive)	1.6	0.7
College Drive (Interstate 25 to Parsley Boulevard)	2.5	0.8
College Drive (Parsley Boulevard to Walterscheid Boulevard)	2.9	0.9
College Drive (Walterscheid Boulevard to U.S. 85)	2.9	0.9
Missile Drive (Interstate 25 to 20th Street)	4.8	1.4
Ames Avenue (Parsley Boulevard to 20th Street)	8.5	2.1
Lincolnway (Pershing Boulevard to Ridge Road)	4.4	1.3
Windmill Road (Dell Range Boulevard to Pershing Boulevard)	4.3	1.2
Ridge Road (Four Mile Road to Dell Range Boulevard)	4.6	1.1
Prairie Avenue (Yellowstone Road to Dell Range Boulevard)	7.6	2.0
Central Avenue (Interstate 25 to Yellowstone Road)	9.1	1.8

Table 2.2.5-2 Continued, page 2 of 2  
CALCULATED CARBON MONOXIDE CONCENTRATIONS

Roadway Configuration	1-Hour Concentration (ppm)	8-Hour Concentration (ppm)
<u>Intersections</u>		
Cheyenne, Wyoming		
16th Street/Warren Avenue	28.8	5.0
Pershing Boulevard/Central Avenue	20.1	3.9
Pershing Boulevard/Warren Avenue	23.4	4.2
Yellowstone Road/Prairie Avenue	30.3	5.7
Pershing Boulevard/Randall Avenue	9.4	1.9
Pershing Boulevard/Converse Avenue	17.9	2.7
20th Street/Warren Avenue	15.1	3.0
Dell Range Boulevard/Ridge Road	12.5	2.7
Kimball, Nebraska		
Route 71 / U.S. 30	7.1	1.3
Wheatland, Wyoming		
16th Street / South Street	21.3	3.8

<sup>a</sup> Includes 1.0 ppm and 0.5 ppm background carbon monoxide levels for 1 and 8-hour periods, respectively.

Table 2.2.5-3

FUGITIVE DUST EMISSION INVENTORY - 1980  
(T/yr)

County	Total Suspended Particulates	Fugitive Dust	Percent Fugitive Dust
<u>Wyoming</u>			
Laramie	44,286	39,147	88.4
Platte	14,221	13,561	95.4
Goshen	14,498	13,557	93.5
<u>Nebraska</u>			
Kimball	11,378	11,038	97.0
Banner	5,153	5,114	99.2
Scotts Bluff	15,474	13,772	89.0

Source: EPA Annual Report, National Emission Data System (EPA 1983).

of Environmental Quality and Nebraska Department of Environmental Control indicate greatest visibility impairment potential to exist between November and March. Median yearly visual range tends to be high, approaching an average of 64 miles (EPA 1979b).

### **3.0 ENVIRONMENTAL CONSEQUENCES, MITIGATION MEASURES, AND UNAVOIDABLE IMPACTS**

This section presents the impacts, mitigation measures, and unavoidable impacts associated with the Proposed Action and its alternatives for each of the environmental resources addressed in this FEIS. The types and levels of impacts are discussed and shown in narrative and graphic form within each subsection.








The area of study initially encompassed that area in which project effects of any magnitude, both direct and indirect, might be expected to occur. Direct impacts are those which are directly attributable to the project itself. Indirect impacts result from the induced population locating in a community related directly or indirectly to the Proposed Action. The area of study is termed the Region of Influence in this document. Its size varies by resource and is defined at the beginning of each resource subsection in Section 2.0.

Following this, a preliminary impact analysis was conducted to determine which area(s) within the Region of Influence would experience potentially important impacts. This area(s) is defined as the Area of Concentrated Study. Section 2.0 contains descriptions of the Areas of Concentrated Study for the various resources while Section 3.0 contains explanations of the methodology used to determine the Area of Concentrated Study for each resource. Further data collection was conducted, if needed, for the Area of Concentrated Study. A detailed impact analysis was then conducted. If impacts were judged not significant for a resource or an element of a resource, the impact discussion has been minimized.

Analysis was conducted in two phases. First, the level of impact intensity was predicted at the site, local, and regional level. Second, a professional judgment was rendered on whether or not the impact, in its context, was significant. "Significant" does not necessarily imply a separate judgment on the overall severity of the impact. Rather, it may indicate a judgment regarding which impacts warrant heightened attention, by the Air Force or others, during project planning; or it may reflect a judgment as to the extent of the action necessary to avoid that impact. It should be emphasized that the analysis assumes that standard construction mitigations will be adopted. This tends to present a conservative analysis, since any additional mitigations provided by the Air Force, state, and local agencies would reduce the impacts from those predicted in this document. Those identified impacts which cannot be avoided by mitigation measures are termed unavoidable adverse impacts and appear at the conclusion of each resource subsection in Section 3.0.

The following two summary matrices (Figures 3.0-1 and 3.0-2) provide an overview of impacts to environmental resources as a result of the Proposed Action and its alternatives.

The first figure identifies the level of impact (negligible, low, moderate, or high) and whether it is significant for each environmental resource. These impacts are categorized as short or long term, according to their time of occurrence. Short-term impacts will occur during construction (before 1990). Long-term impacts will occur during operation (after 1990). If an impact is generated during the construction or short-term period and the impact has a long duration into the operational phase (1990 and beyond), it is identified in both the short and long-term columns. The operational impacts assessed for each resource would continue to be realized at the same level of impact for the foreseeable future. Extent of impacts is assigned to one of three geographical levels: site (where local direct construction activities occur), local (within a city jurisdiction or district surrounding an impacted area), and regional (within the Region of Influence defined for each environmental resource in Section 2.0).

LEGEND		ADVERSE IMPACTS	SIGNIFICANT ADVERSE IMPACTS
LEVEL OF IMPACT*	LOW		
	MODERATE		
	HIGH		
POTENTIAL BENEFICIAL EFFECTS			
* MEASURE OF THE AMOUNT OF ENVIRONMENTAL CHANGE			

	PROPOSED ACTION					
	SHORT TERM			LONG TERM		
	SITE	LOCAL	REGIONAL	SITE	LOCAL	REGIONAL
Employment Demand		■	■		■	
Housing		○				
Public Finance		●				
Construction Resources		■	■			
Social Well-Being		○			■	
Public Services and Facilities		●			○	
Utilities		●				
Energy Resources		○			○	
Transportation	●	●	●	■	■	■
Land Use	○	○		○	○ <sup>1</sup>	
Recreation		●	●		○	○
Cultural and Paleontological Resources	●			● <sup>2</sup>		
Visual Resources	○					
Water Resources	○	●	○	○	○	○
Biological Resources	●		●	● <sup>2</sup>		
Threatened and Endangered Species	●		●	● <sup>1</sup>		
Geological Resources	○	○			○	
Noise						
Air Quality		○				

Note: Adverse impacts are identified with various sized circles and are blackened if significant. If there are also beneficial effects, a dot pattern is included. In some cases, there are both adverse impacts and beneficial effects for the same resource.

<sup>1</sup> Impacts are those generated by construction activities and having a long duration.

<sup>2</sup> Impacts are those generated by construction activities and having a long duration as well as those generated only by operational activities.

**FIGURE 3.0-1 SUMMARY OF PROPOSED ACTION IMPACTS**

LEGEND			ADVERSE IMPACTS	SIGNIFICANT ADVERSE IMPACTS
LEVEL OF IMPACT*	LOW	MODERATE	HIGH	
	○	○	○	●
				●
				●
*MEASURE OF THE AMOUNT OF ENVIRONMENTAL CHANGE				

CABLE PATHS <sup>1</sup>										ROADS <sup>2</sup>			DISPATCH <sup>3</sup> STATIONS			
PROPOSED ACTION					ALTERNATIVES					ALTERNATIVES		PROPOSED ACTION	ALTERNATIVES			
PA1	SB1	RB1	PA4	PA5	PD1	SB2	PB1	PA2	PA3	RB2	R2	R1	R3	Two	One	None
											○	●	○	○	○	
	●	●	●	●	●	●	●		●	●	●	●	●			
○	○	○	○	○	○	○	○	○	○	○			○			
○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
	○	○	○	○	○	○	○	○	○	○	○	○	○			
	○	○	○	○	○	○	○	○	○	○	○	○	○			

Notes: 1 Denotes specific cable paths. For location of cable paths see Section 1.6.3-3

2 For location of alternative routes see Section 1.6.2

3 For location of dispatch stations see Section 1.6.6

FIGURE 3.0-2 ALTERNATIVES COMPARISON MATRIX



LEGEND			ADVERSE IMPACTS	SIGNIFICANT ADVERSE IMPACTS
LEVEL OF IMPACT *	LOW	○	●	
	MODERATE	○	●	
	HIGH	○	●	
* MEASURE OF THE AMOUNT OF ENVIRONMENTAL CHANGE				
Visual Resources				
Water Resources				
Threatened and Endangered Species				
Geologic Resources				
Air Quality				

CABLE PATHS <sup>1</sup>												ROADS <sup>2</sup>			DISPATCH <sup>3</sup> STATIONS		
PROPOSED ACTION						ALTERNATIVES						PROPOSED ACTION		ALTERNATIVES			
PA1	SB1	RB1	PA4	PA5	PD1	SB2	PB1	PA2	PA3	RB2	R2	R1	R3	Two	One	None	
○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○		
●	●	●	●	●	●	●	●	●	●	●	●	●	●				
○	○	○	○	○	○	○	○	○	○	○	○	○	○	○			
○	○	○	○	○	○	○	○	○	○	○	○	○	○				
○	○	○	○	○	○	○	○	○	○	○	○	○	○				

Notes: 1 Denotes specific cable paths. For location of cable paths see Section 1.6.3-3

2 For location of alternative routes see Section 1.6.2

3 For location of dispatch stations see Section 1.6.6

FIGURE 3.0-2 Continued ALTERNATIVES COMPARISON MATRIX

This presentation provides a visual ranking within each environmental resource but cannot be used to compare separate resources. Definitions of level of impact and significance for each environmental resource appear at the beginning of each resource section.

The second figure compares the project element alternatives associated with the Proposed Action. Only those environmental resources which identify a low, moderate, or high impact associated with an alternative are featured. The level of impact and significance definitions are the same as for the first figure. The alternatives considered have to do with the 3 dispatch station options, 11 cable system routes, and 3 access routes from F.E. Warren AFB as described in Section 1.0.

Both figures result from the impact analysis presented in this chapter. Summary impact figures appear at the conclusion of the impact analysis for each environmental resource. In these impact figures, the level of impact and significance is aggregated first to the element level then from the element level to the environmental resource. The explanation of how aggregation was accomplished is described at the conclusion of the section for each resource.

The Summary of Proposed Action Impacts (Figure 3.0-1) has changed for some environmental resources since the publication of the DEIS and those changes are discussed below.

Impact summaries for the following environmental resources have remained the same since publication of the DEIS: public services and facilities, land use, recreation, visual resources, geologic resources, noise, and air quality. Impact and/or significance summary findings were modified for some environmental resources and the justification is provided as follows.

The long term, beneficial effect for employment demand has been removed from the regional level since the benefits are accounted for solely at the local level (i.e., Cheyenne).

Due to revised baseline forecasts and projected housing requirements, the housing resource levels of impacts were revised downward from moderate to low in the short term and from low to negligible in the long term to indicate a decreased impact. For the same reason, the short-term significance rating was changed to not significant.

The short-term impact for public finance was changed to significant due to an increase in the weight given to a significant impact to Laramie School District No. 1 whose jurisdiction encompasses a majority of the population within the project area. The long-term impact has been reduced to negligible due to the redefinition of the long term to cover the operational period of the project.

The short-term, regional impact to construction resources has been reduced from low to negligible. This change resulted from a more thorough research of industrial capacity to supply construction materials and a reevaluation of the composite impact of the project upon all of the construction resource categories. Beneficial effects are now noted for the local area.

For social well-being the focus of the assessment has been expanded from certain population subgroups within a community to the community as a whole. This has resulted in a reduction in short-term impact from moderate and significant to low and not significant. Long-term effects are now beneficial due to increased cultural diversity and improvements in the local economy.

The short-term, site-level impact for utilities has been lowered from low to negligible because the surcharging sewer serving F.E. Warren AFB is not causing an environmental impact on the base.

For energy resources, the short and long-term, regional impacts were reduced from low to negligible. The short-term, local impact was reduced from moderate to low. These changes reflect a professional judgment of the composite impact of the project upon energy resources.

The short-term, regional transportation impact has remained at the same level but changed to significant. This is a result of traffic delays due to the greater extent of road modifications proposed in the FEIS.

For some onbase historic buildings, operational requirements may necessitate modifications which are not in conformance with historic preservation requirements. Therefore, the short-term impacts have been changed to significant and remain moderate. For the same reason the long-term impact has been increased to moderate and significant. In addition, implementation of a cultural resources management plan incorporating most of the assumed mitigation measures and design guidelines for these facilities will result in a net beneficial effect.

Long-term, regional impacts to water resources have been increased from negligible to low and not significant. This has resulted from further water quality analysis which demonstrates that local water quality impact in Cheyenne may extend downstream to create broader, regional impacts, as well.

For biological resources the short-term regional and the long-term site-level impacts have been reduced from moderate to low and have remained significant. This has resulted from the implementation of assumed mitigation measures and a reevaluation of the composite impact of the project upon all biological resource elements in these two impact categories. The long-term, regional impact has been reduced to negligible to reflect the composite impact of the biological elements in this category. The realignment of a proposed new road at F.E. Warren AFB and the timely implementation of certain mitigation measures has resulted in a reduction in the short and long-term impact for threatened and endangered species (i.e., the Colorado butterfly plant) to moderate and significant. The composite of the long-term, regional impacts has been judged to be negligible.

### **3.1      Human Resources**

#### **3.1.1    Employment Demand**

##### **3.1.1.1   Introduction**

The analysis of employment demand serves to describe the regional economy's available labor force which may be utilized for the project. This evaluation is done in order to determine the need for labor not available within the region. As a result of the evaluation of need for nonlocal labor, it is possible to estimate the resulting immigration of workers and their families.

Although population immigration resulting from the project is developed in this analysis, no population impact assessment is evaluated in this section. This is because population impact, in terms of numbers of people alone, is reflected in related population needs. The direct impacts of population on the housing market, the public finances of the area, utilities, and public services are discussed in those respective sections.

The generation of employment demand, and the resulting employment of labor and increased personal income is desirable, and therefore considered to be a beneficial effect. In general, the project is not expected to generate changes in overall price levels. General economic theory suggests that when excess capacity in the labor market is not utilized to the fullest extent (i.e., unemployment not reduced to its frictional minimum), economywide inflation does not occur. Table 3.1.1-4, in Section 3.1.1.4.2, indicates that the labor market does not utilize fully its excess capacity, and therefore no project induced economywide inflation is expected. Specific markets, such as multifamily housing units in Cheyenne, specific labor crafts, and some materials (aggregate and/or asphalt, for example) may show minor price increases paralleling changes in the wholesale price index though it is expected that such increase will be small. The concern for the potentially adverse side effects of wage escalation and inflation are considered in the analyses of housing and social well-being.

The justification for the employment demand Area of Concentrated Study is based on the allocation of population to counties as shown in Table 3.1.1-7, Section 3.1.1.4.2. The Area of Concentrated Study is defined as those counties which will receive project-associated immigrants.

The information in this section is based upon data and detailed analysis contained in the Socioeconomic Environmental Planning Technical Report.

##### **3.1.1.2    Employment Demand Level of Impact Definitions**

As mentioned above, the employment of labor which is otherwise unemployed without the project is a beneficial impact for the region. As such, there is no assessment of levels of impact for employment demand. Criteria used to evaluate the impact of the project on the local economy include:

- o    The change in income with the project;
- o    The change in the unemployment rate; and
- o    The degree of utilization of the local labor force.

##### **3.1.1.3    Employment Demand Significance Criteria**

Because employment demand is considered to be beneficial to the region, no determination of significance is made.

#### 3.1.1.4 Assumptions, Assumed Mitigations, and Environmental Impacts of the Proposed Action and Project Alternatives

Assumptions. Economic impacts of the Proposed Action are related to effects on local and regional labor and the need for immigration. Local and regional labor available are allocated to meet direct project requirements, procurement-induced demands, and personal consumption-induced demands. Direct project employees hired in the region are assumed not to relocate.

Some jobs will be filled by persons shifting from their present jobs to project-related employment. Needs in excess of the available local and regional labor force are assumed to be met through immigration. Immigrants are allocated to communities based on the proximity of job sites to the respective communities. Category-specific household sizes are used to determine the number of accompanying dependents.

Analytic methods for the No Action Alternative included the use of a cohort-survival model to estimate population by age and sex for the Colorado counties of the Region of Influence, and an econometric model to project levels of associated economic activity. Population estimates for Wyoming and Nebraska counties are taken from the relevant state forecasts. Models were developed at the county level with the exception of the Denver metropolitan area where the analysis was done for the area as a whole. The forecast of the Laramie County economy was augmented with the information developed for the basic-sector forecast accomplished for the Economic Base Analysis of Laramie County, Wyoming. The resulting employment and income estimates were then used as input to estimate project impacts in Laramie County. The results of the cohort-survival models and the econometric models are summarized in Section 3.1.1.4.1.

The economic impact of the project is assessed through the use of an input-output model which determines the total economic activity of the project from the input of the direct employment and spending impacts. The input-output results are calibrated with the results of a survey-based Economic Base Analysis of Laramie County, Wyoming. The industrial multipliers and location quotients derived from the Economic Base study are applied to the employment and material purchase estimates in order to determine the proportion of regional employment occurring in Laramie County. The total impact of the project is then compared with the forecast of without-project economic activity based on the cohort survival and econometric models described above. These comparisons are used to estimate the total economic impact, and labor immigration levels. The results of all model interactions are summarized in Section 3.1.1.4.2.

Assumed Mitigations. No assumed mitigations are utilized for the analysis of employment demand.

Environmental Impacts. Environmental impacts of the Proposed Action and project alternatives are discussed in the following subsections.

##### 3.1.1.4.1 Baseline Future - No Action Alternative

The 16-county Region of Influence has an estimated 1983 population of 2.2 million. This figure is projected to increase to 2.6 million by 1990 (Table 3.1.1-1). The projected increase implies a growth rate of 2.4 percent which is lower than the increase that occurred between 1970 and 1980. After 1990, it averages 2.1 percent per year.

The number of households in the Region of Influence in 1983 is estimated to be 858,000. Between 1970 and 1980, the number of households increased 4.4 percent per year.

Table 3.1.1-1  
PROJECTED ECONOMIC DATA FOR THE 16-COUNTY REGION  
WITHOUT THE PROJECT

Year	Population	Households	Labor Force	Gross LFPR <sup>1</sup>	Resident Employment	Unemployed Workers
1983	2,219,680	858,160	1,172,210	52.8	1,116,155	56,058
1984	2,275,850	891,160	1,220,700	53.6	1,168,505	52,196
1985	2,333,120	921,370	1,263,050	54.1	1,210,788	52,259
1986	2,389,970	951,970	1,302,510	54.5	1,248,707	53,807
1987	2,447,190	978,850	1,343,250	54.9	1,289,346	53,902
1988	2,504,370	1,010,520	1,382,480	55.2	1,328,414	54,067
1989	2,561,770	1,042,870	1,419,730	55.4	1,365,055	54,671
1990	2,619,060	1,070,830	1,456,160	55.6	1,401,225	54,933
1991	2,676,280	1,099,020	1,491,600	55.7	1,436,249	55,355
1992	2,733,310	1,132,650	1,525,860	55.8	1,469,522	56,339

Year	Employment By place Of Work	Earnings (Millions of Current \$)	Earnings (Millions of 1982 \$)	Earnings per Workers (Current \$)
1983	1,226,904	23,498.9	22,620.4	19,200
1984	1,286,514	25,977.0	23,868.3	20,200
1985	1,338,248	28,480.7	24,881.3	21,300
1986	1,387,239	31,255.8	25,837.5	22,500
1987	1,438,216	34,325.3	26,774.0	23,900
1988	1,483,436	37,515.2	27,551.3	25,300
1989	1,528,144	41,073.4	28,374.0	26,900
1990	1,575,017	45,209.7	29,369.9	28,700
1991	1,622,976	49,860.4	30,433.3	30,700
1992	1,670,327	54,919.1	31,566.2	32,900

Year	Unemployment Rate	Personal Income		Personal Income	
		(Millions of Current \$)	(Millions of 1982 \$)	Per Capita (Current \$)	Per Capita (1982 \$)
1983	4.78	30,568.9	29,426.1	13,800	13,300
1984	4.28	33,698.7	30,963.1	14,800	13,600
1985	4.14	37,063.5	32,379.5	15,900	13,900
1986	4.13	40,743.6	33,680.5	17,000	14,100
1987	4.01	44,781.3	34,929.8	18,300	14,300
1988	3.91	49,062.9	36,032.0	19,600	14,400
1989	3.85	53,767.2	37,143.0	21,000	14,500
1990	3.77	59,079.5	38,380.2	22,600	14,700
1991	3.71	65,151.2	39,766.4	24,300	14,900
1992	3.69	71,790.8	41,263.7	26,300	15,100

<sup>1</sup> Gross labor force participation rate (LFPR) = unemployment plus employment divided by population.

The labor force in the Region of Influence in 1983 is approximately 1.2 million persons. The projected increase to 1.4 million in 1990 is due primarily to increases in the projected gross labor force participation rate. The gross labor force participation rate stood at 42 percent in 1970 and increased to 52 percent by 1983. The regional rate is projected to follow national trends by continuing to increase, although at a decreasing rate. In 1990, the gross labor force participation rate is projected to be approximately 56 percent.

Unemployment rates for the region are projected to follow the national forecast of slowly declining rates from the current high levels. The 1983 rate of unemployment is estimated to be 4.8 percent, although for the 1982 to 1983 winter months the seasonal rate was much higher at about 8 percent. This rate is for the entire region, while for some Region of Influence counties the unemployment rate in 1983 was even higher, at about 12 percent. The peak year for unemployment prior to 1983 was 1975, when the unemployment rate reached 5.0 percent. The forecast rate for 1990 is 3.8 percent. Constant-dollar earnings per worker are projected to reach their pre-recession level of \$18,400 by 1984. After 1984, constant-dollar earnings per worker are expected to increase at 0.2 percent per year. This rate of increase is below the 1970 to 1980 growth rate of 0.9 percent. The projection generally follows the assumption of a gradual recovery from the recent recession.

Before identifying the project-related labor demand in the discussion of the Proposed Action, there are several onbase projects which will require labor otherwise available for project use. These projects include building a commissary, base exchange, and a one-for-one replacement of military family housing. These projects are considered to occur over and above normal base maintenance, and all will require direct construction labor. As a result of the employment of available local labor without the project, additional labor for the Proposed Action will need to immigrate.

#### 3.1.1.4.2 Proposed Action

The economic impact of the Proposed Action is principally defined by the change in income employment caused by the project, and the interaction with the local labor market which induces population immigration.

Table 3.1.1-2 shows the project average annual direct employment requirements. The table indicates that the peak year for total project-related employment impact occurs in 1986. The 1991 workforce of 475 is the long-term project workforce, and is expected to remain constant for all subsequent years during the operational phase of the project. After 1991, the immigration population characteristics are assumed to be similar to the existing military population.

Table 3.1.1-3 shows the average number of jobs including those which are considered to be filled by available local labor; as well as those filled by weekly commuters and immigrants, on an annual average basis. In general, available local labor will fill most of the road and construction jobs, and nearly all indirect jobs. Principal trade requirements for project construction include general laborers, carpenters, sheet metal workers, and masons. The onbase construction labor described in Section 3.1.1.4.1 and the indirect workers associated with that activity are assumed to be employed before allocation of project employment. Table 3.1.1-4 shows the annual unemployment rate with and without the project. The with-project unemployment rate shown in Table 3.1.1-4 includes the immigrating (and outmigrating after 1987) workers.

Table 3.1.1-2

## PROJECT AVERAGE MANPOWER REQUIREMENTS BY YEAR

	1984	1985	1986	1987	1988	1989	1990	1991
<u>Deployment Area</u>								
Construction	5	40	60	60	40	0	0	0
A&CO	0	15	210	285	265	265	10	0
Operations	0	0	0	0	0	0	0	0
DAR	0	275	315	150	0	0	0	0
Subtotal	5	330	585	495	305	265	10	0
<u>Operating Base</u>								
Construction	100	630	70	0	0	0	0	0
A&CO	40	130	525	555	515	510	22	0
Operations	0	130	415	490	500	500	475	475
Subtotal	140	890	1,010	1,045	1,015	1,010	497	475
TOTAL:	145	1,220	1,595	1,540	1,320	1,275	507	475

Table 3.1.1-3

## TOTAL REGION OF INFLUENCE JOBS, LOCAL AND REGIONAL HIRES, AND IMMIGRATION

	1984	1985	1986	1987	1988	1989	1990	1991 and on
Total (Direct/Indirect) Additional Jobs <sup>1</sup>	250	2,400	2,650	2,550	2,025	1,825	650	590
Average Annual Local Hires	150	1,750	1,525	1,350	1,100	815	225	230
Average Annual Weekly Commuters	25	225	175	100	25	10	0	0
Average Annual Immigrant Workers	75	425	950	1,100	925	1,000	425	360
Unsuccessful Job-Seekers <sup>2</sup>	30	185	180	150	165	110	70	0
Immigrant <sup>3</sup> Population	275	1,475	2,875	3,200	3,025	2,875	1,200	925

<sup>1</sup> Jobs are filled by local hires, weekly commuters, or immigrant workers.

<sup>2</sup> Unsuccessful Job-Seekers reflect only principal workers. The following tables show accompanying dependents as well.

<sup>3</sup> Based on immigrant workers and unsuccessful job-seekers, and accompanying dependents.



Table 3.1.1-4

## NO ACTION AND PROJECT AVERAGE ANNUAL UNEMPLOYMENT PERCENTAGE RATES

	1984	1985	1986	1987	1988	1989	1990	1991
Without-Project Unemployment Rate Laramie County	8.2	7.9	7.7	7.3	6.9	6.7	6.4	6.2
With-Project Unemployment Rate Laramie County	7.4	6.3	5.1	4.2	5.5	5.5	6.0	5.6
Without-Project Unemployment Rate - Region of Influence	4.3	4.1	4.1	4.0	3.9	3.9	3.8	3.7
With-Project Unemployment Rate - Region of Influence	4.3	4.0	4.0	3.9	3.9	3.8	3.8	3.7

Table 3.1.1-5

## LOCATION OF AVERAGE ANNUAL WEEKLY COMMUTERS

Year	1984	1985	1986	1987	1988	1989
Location						
Cheyenne	25	75	125	25	(a)	(a)
Chugwater	0	(a)	(a)	0	0	0
Pine Bluffs	0	0	25	0	0	0
Wheatland	0	150	25	0	0	0
Torrington	0	0	0	0	0	0
Kimball	0	0	0	75	(a)	0
Gering-Scottsbluff	0	(a)	(a)	0	0	0

<sup>a</sup> Estimated to be less than 10 persons

For the with-project unemployment rates shown in Table 3.1.1-4, the unsuccessful job-seekers and those accompanying dependents which unsuccessfully seek employment are considered to be part of the unemployed labor force, irrespective of whether or not they would actually be counted statistically as unemployed, due to the lack of qualifications for unemployment compensation, etc.

Based on the amount of local labor available, hiring practices of contractors, and average household size and accompanying dependent factors, an estimate is made of the number of workers and their families expected to immigrate as a result of project demand for workers which cannot be satisfied by locally available labor. Population is allocated to the communities of Wheatland, Chugwater, Torrington, Gering, Scottsbluff, and Pine Bluffs which are distant from F.E. Warren AFB, but close to groups of silos. In the event that the Air Force requires workers to report to a central location (such as a dispatch area in Cheyenne or Kimball), population would be more concentrated around the dispatch center. This has not been a requirement in the past.

Inmigrant workers and families are directly allocated to communities, rather than rural areas with low population density. Inmigrants are temporary residents who would utilize existing services (water, power, etc.).

Rural (farmhouse, etc.) locations are generally self-sufficient, requiring few urban services. Since the purpose of this study is to determine the capacity of the existing infrastructure to serve additional residents, allocation of inmigrants to rural areas would reduce the potential impact upon the communities of the region. Accordingly, all impact population is allocated to cities or towns on the basis of proximity to job sites.

A part of the local labor force will be commuting from places too distant for daily driving, such as Sheridan or Rock Springs. Table 3.1.1-5 shows the yearly average number of weekly commuters by community.

The estimated project immigration is shown in Table 3.1.1-6. It is worth noting that, due to the higher unemployment rates in the Wyoming portion of the Region of Influence, there is no need for immigration of indirect labor. Therefore all of the principal workers from among the "workers and families" shown are inmigrants for direct project work. Only direct worker accompanying dependents and some of the unsuccessful job-seekers (identified as "transients") will immigrate in search of indirect jobs.

The immigration estimates shown in Tables 3.1.1-6, 3.1.1-7, and 3.1.1-8 are annual totals, and when they decline from 1 year to the next, such as after 1987 in Cheyenne, this reflects an outmigration of workers no longer employed with the project. Figure 3.1.1-1 shows the age/sex characteristics of the inmigrant population for Cheyenne in the peak year of immigration (1987).

A comparison of population impacts associated with baseline estimates for each of the counties affected is shown in Table 3.1.1-7. A community-specific comparison is shown in Table 3.1.1-8. The baseline forecasts shown in Tables 3.1.1-7 and 3.1.1-8 reflect the most recently prepared state forecasts of population for Wyoming and Nebraska.

In addition to the average annual estimates given in Tables 3.1.1-6, 3.1.1-7, and 3.1.1-8, Table 3.1.1-9 shows the additional population which affects the Cheyenne Urban Area in the peak quarter from 1984 through 1987. These tables are shown in addition to the annual average in order to show the cyclical pattern of work at the base, and to identify the peak impact. The quarterly fluctuations are expected to be visible only in Cheyenne. In all cases, the peak quarter impact occurs in the third quarter of each calendar year.

Table 3.1.1-6

ANNUAL IMMIGRATION TOTALS, INCLUDING PROJECT WORKERS  
AND TRANSIENTS

	1984	1985	1986	1987	1988	1989	1990	1991 & On
Cheyenne Total	275 <sup>a</sup>	1,350	2,275	2,625	2,450	2,325	1,200	925
Albin Total	0	(b)	(b)	(b)	0	0	0	0
Chugwater Total	0	50	50	50	0	0	0	0
Pine Bluffs Total	0	0	0	0	150	0	0	0
Wheatland Total	0	75	450	200	0	0	0	0
Torrington Total	0	0	0	225	0	0	0	0
Kimball Total	0	0	0	0	75	300	0	0
Gering-Scottsbluff Total	0	0	100	100	350	250	0	0
TOTAL:	275	1,475	2,875	3,200	3,025	2,875	1,200	925

<sup>a</sup> All immigration totals are rounded upward to the next 25.

<sup>b</sup> Estimated to be less than 10 persons.

<sup>1</sup> The location of persons in Scottsbluff and Gering is dependent upon the availability and cost of housing or hotels, etc., as the services of these adjacent communities are similar. For purposes of analysis, 67 percent are expected to go to Scottsbluff and 33 percent to Gering.

Table 3.1.1-7

## BASELINE AND PROJECT IMMIGRATION POPULATION ESTIMATES BY COUNTY

Region	1984	1985	1986	1987	1988	1989	1990	1991	1992
Laramie County									
Baseline	71,248	72,911	74,246	75,859	77,437	79,157	80,777	82,545	84,185
Workers & Families <sup>1</sup>	206	1,026	2,047	2,363	2,306	2,093	1,044	925	925
Transients & Families <sup>1</sup>	69	324	228	262	294	232	156	0	0
TOTAL:	71,523	74,261	76,521	78,484	80,037	81,482	81,977	83,470	85,110
Platte County									
Baseline	9,550	9,760	9,970	10,190	10,440	10,710	10,960	11,210	11,470
Workers & Families <sup>1</sup>	-	125	453	229	-	-	-	-	-
Transients & Families <sup>1</sup>	-	-	47	21	-	-	-	-	-
TOTAL:	9,550	9,885	10,470	10,440	10,440	10,710	10,960	11,210	11,470
Goshen County									
Baseline	12,220	12,310	12,500	12,720	12,930	13,180	13,380	13,530	13,690
Workers & Families <sup>1</sup>	-	-	-	199	-	-	-	-	-
Transients & Families <sup>1</sup>	-	-	-	26	-	-	-	-	-
TOTAL:	12,220	12,310	12,500	12,945	12,930	13,180	13,380	13,530	13,690
Kimball County									
Baseline	4,840	4,830	4,820	4,820	4,820	4,810	4,810	4,800	4,800
Workers & Families <sup>1</sup>	-	-	-	-	75	276	-	-	-
Transients & Families <sup>1</sup>	-	-	-	-	-	24	-	-	-
TOTAL:	4,840	4,830	4,820	4,820	4,895	5,110	4,810	4,800	4,800
Scotts Bluff County									
Baseline	39,970	40,390	40,800	41,210	41,630	42,050	42,480	42,890	43,310
Workers & Families <sup>1</sup>	-	-	88	88	315	238	-	-	-
Transients & Families <sup>1</sup>	-	-	12	12	35	12	-	-	-
TOTAL:	39,970	40,390	40,900	41,310	41,980	42,300	42,480	42,890	43,310
<sup>1</sup> Project-related									

Table 3.1.1-8

## BASELINE AND PROJECT IMMIGRATION POPULATION ESTIMATES BY COMMUNITY

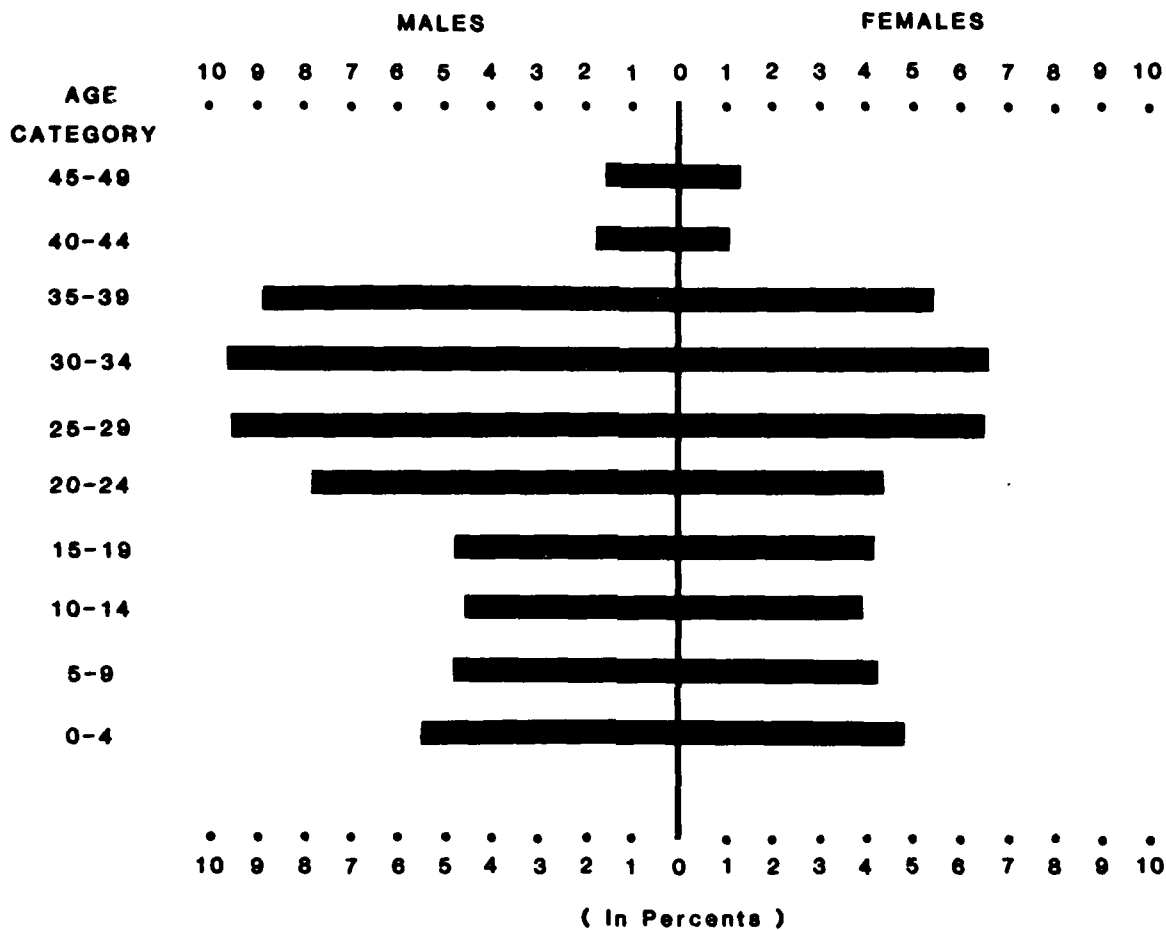
Region	1984	1985	1986	1987	1988	1989	1990	1991	1992
<b>Cheyenne (Urban Area)</b>									
Baseline	65,730	67,210	68,420	69,870	71,290	72,840	74,300	75,890	77,360
Workers & Families <sup>1</sup>	206	1,026	2,047	2,363	2,156	2,093	1,044	925	925
Transients & Families <sup>1</sup>	69	324	228	262	294	232	156	0	0
<b>TOTAL:</b>	<b>66,005</b>	<b>68,560</b>	<b>70,695</b>	<b>72,495</b>	<b>73,740</b>	<b>76,165</b>	<b>75,500</b>	<b>76,815</b>	<b>78,285</b>
<b>Albin</b>									
Baseline	132	133	134	135	136	137	138	139	140
Workers & Families <sup>1</sup>	-	a	a	a	-	-	-	-	-
Transients & Families <sup>1</sup>	-	-	-	-	-	-	-	-	-
<b>TOTAL:</b>	<b>132</b>	<b>133</b>	<b>134</b>	<b>135</b>	<b>136</b>	<b>137</b>	<b>138</b>	<b>139</b>	<b>140</b>
<b>Chugwater</b>									
Baseline	240	250	260	270	280	290	300	310	310
Workers & Families <sup>1</sup>	-	50	50	50	-	-	-	-	-
Transients & Families <sup>1</sup>	-	-	-	-	-	-	-	-	-
<b>TOTAL:</b>	<b>240</b>	<b>300</b>	<b>310</b>	<b>320</b>	<b>280</b>	<b>290</b>	<b>300</b>	<b>310</b>	<b>310</b>
<b>Pine Bluffs</b>									
Baseline	1,130	1,144	1,158	1,172	1,186	1,200	1,215	1,230	1,245
Workers & Families <sup>1</sup>	-	-	-	-	150	-	-	-	-
Transients & Families <sup>1</sup>	-	-	-	-	-	-	-	-	-
<b>TOTAL:</b>	<b>1,130</b>	<b>1,144</b>	<b>1,158</b>	<b>1,172</b>	<b>1,336</b>	<b>1,200</b>	<b>1,215</b>	<b>1,230</b>	<b>1,245</b>

Table 3.1.1-8 Continued page 2 of 2  
PROJECT IMMIGRATION ESTIMATES

Region	1984	1985	1986	1987	1988	1989	1990	1991	1992
Wheatland									
Baseline	4,620	4,720	4,820	4,930	5,050	5,190	5,310	5,440	5,590
Workers & Families <sup>1</sup>	-	75	403	179	-	-	-	-	-
Transients & Families <sup>1</sup>	-	-	47	21	-	-	-	-	-
TOTAL:	4,620	4,795	5,270	5,130	5,050	5,190	5,310	5,440	5,590
Torrington									
Baseline	5,620	5,700	5,870	6,070	6,260	6,490	6,680	6,820	6,970
Workers & Families <sup>1</sup>	-	-	-	199	-	-	-	-	-
Transients & Families <sup>1</sup>	-	-	-	26	-	-	-	-	-
TOTAL:	5,620	5,700	5,870	6,295	6,260	6,490	6,680	6,820	6,970
Kimball City									
Baseline	3,140	3,150	3,160	3,170	3,180	3,190	3,200	3,210	3,220
Workers & Families <sup>1</sup>	-	-	-	-	75	276	-	-	-
Transients & Families <sup>1</sup>	-	-	-	-	-	24	-	-	-
TOTAL:	3,140	3,150	3,160	3,170	3,255	3,490	3,200	3,210	3,220
Gering-Scottsbluff									
Baseline	23,370	23,740	24,100	24,460	24,830	25,200	25,580	25,940	26,320
Workers & Families <sup>1</sup>	-	-	88	88	315	238	-	-	-
Transients & Families <sup>1</sup>	-	-	12	12	35	12	-	-	-
TOTAL:	23,370	23,740	24,200	24,560	25,180	25,450	25,580	25,940	26,320

<sup>1</sup> Project-related

<sup>a</sup> Estimated to be less than 10 persons



CHEYENNE, WYOMING  
1987

FIGURE 3.1.1-1 AGE SEX DISTRIBUTION FOR THE IMMIGRANT PROJECT POPULATION

### 3.1.1.4.3 Consideration of Alternatives

The project alternatives entail the use of different dispatch centers which are used as administrative, dispatch, and storage areas. As such, they will be staffed by locally hired personnel, and changing their location will not alter immigration. Other alternatives, namely road and cable paths also will not alter immigration.

### 3.1.1.5 Summary of Impacts

A detailed impact matrix is shown in Figure 3.0-1. This assessment applies for all alternatives. See Section 3.1.1.5.1 for the summary.

#### 3.1.1.5.1 Aggregation of Elements, Impacts, and Significance

The analysis of employment demand makes no assessment of impact levels, or of significance, as the impact is considered to be beneficial. No method of aggregation is required for employment demand, as only one element is considered.

Table 3.1-9  
PEAK QUARTER LESS AVERAGE ANNUAL IMMIGRATION  
CHEYENNE URBAN AREA

Additional Residents:	1984	1985	1986	1987	1988 on
Total Immigrants	50	525	150	75	0
Workers and Families	25	244	73	27	0
Transients and Families	25	281	77	48	0
Weekly Commuters	0	50	0	0	0

### 3.1.1.6 Mitigation Measures

The impact of the project on the area economy is considered to be beneficial and therefore does not require mitigation. The procedures listed here are suggested as methods to augment the local hiring estimated in the analysis.

Methods to enhance labor force availability include job training programs and employment referral systems. Job training programs would alter the population impacts because they would provide a greater locally available labor force with project-related skills. These programs would entail the training of workers in the trades required for decommissioning of Minuteman and Launch Facility modification. As more local labor becomes available for direct employment, the need for immigration will be reduced (contractor or Air Force). Job training programs would be run by the unions or the contractors, at the expense of the contractor. A job training program is not expected to alter the assessed level of impact. Any program should be implemented as early as possible in order to be most effective, and should be initiated by the end of 1984.



Another measure to lessen the impact on immigration, would be a job referral service dedicated to project-related employment (over and above the usual "hiring hall" arrangement for construction workers). An efficient referral system, especially one involved with all forms of available jobs, both direct and indirect, would reduce labor market friction. This would have two implications. First, the unemployment rate would be reduced. Secondly, labor market friction among immigrants would also be reduced, thereby reducing the need for immigration. The results of such programs have previously been described. The hiring hall could run with the aid of the state employment security administration in order to best offer a complete referral program. The hiring hall or job referral program should be implemented just prior to the commencement of construction activities.

One aid to be used in the placement of labor would be better information about job availability, as facilitated with the aid of advertising, and possibly a well publicized (toll-free) telephone number for job availability information. This would be used concurrently with the job referral program.

#### 3.1.1.7 Unavoidable Adverse Impacts

The analysis of employment demand considers no impacts to be unavoidable.

#### 3.1.1.8 Irreversible and Irretrievable Resource Commitments

There are no irreversible and irretrievable resource commitments associated with the employment demand resource because labor is considered a highly mobile resource.

#### 3.1.1.9 Relationship Between Local Short-Term Use of Man's Environment and Maintenance and Enhancement of Long-Term Productivity

The use of local labor, and the increased demand for goods and services in the area will enhance the productivity of the local economy in the short run. In addition, the long-term, operational phase of the project creates additional employment over baseline conditions for indirect jobs as well as for locally hired civilian operations personnel. This reflects a more productive use of resources in that these jobs would not exist without the project, and that area employment would be reduced without these jobs. The experience obtained by project workers and indirect workers which would have been unemployed in the absence of the project, implies greater productivity for these persons in the long term. As such, this is considered to be beneficial to these persons, enhancing long-term productivity.

### 3.1.2 Housing

#### 3.1.2.1 Introduction

This section describes the impacts of the Proposed Action on housing, the criteria used to determine levels of impact and significance, and the procedures used to estimate impacts.

The housing Area of Concentrated Study consists of those communities and geographic and politically distinct areas in which project-attributable population growth approaches or exceeds baseline projected growth by more than 5 percent in any given year. Increased population in a service area is the most important factor in determining likely effects on housing.

Justification for the housing Area of Concentrated Study was determined by analyzing a body of western growth and development literature (Cortese 1977, 1980, 1982; Leistritz and Maki 1981; Thompson et al. 1978). These sources collectively support the position that impacts generated by less than 5-percent average incremental population growth in any given impact year are manageable and can be absorbed by most communities.

The information in this section is based upon data and detailed analysis contained in the Socioeconomics Environmental Planning Technical Report.

#### 3.1.2.2 Definition of Levels of Impact

For housing, level of impact is based on the demand for a particular housing type and the historic supply changes. For purposes of this analysis, the growth cycle for a particular housing type occurs when there are increases in project demand. Decline cycle for a particular housing type occurs when there are decreases in project demand. Growth and decline cycles may occur and recur as a result of the variations in scheduling of construction activities. Short term is defined as the project construction and deployment period. Long term is defined as the operations period following project construction and deployment. The following are the housing resource levels of impact definitions:

- o Negligible Impact - Growth Cycle: Project demands do not exceed projected vacancy. Any changes in housing supply would be inconsequential. Decline Cycle: Vacancies resulting from decreases in project demand can be absorbed by projected baseline growth. Any increase in excess supply would be inconsequential.
- o Low Impact - Growth Cycle: Project demand exceeds projected baseline vacancy. Supply requirements (baseline and project) to meet additional demand would not substantially exceed the (1970-1982) average annual production level. Decline Cycle: Excess supply resulting from decreases in project demand results in an increase in the vacancy rate approaching but not exceeding the average annual (1970-1982) vacancy rate.
- o Moderate Impact - Growth Cycle: Project demand exceeds the projected baseline vacancy. Supply requirements (baseline and project) to meet the additional demand would exceed the average annual but not the highest historical (1970-1982) production level. Decline Cycle: Excess supply resulting from decreases in project demand results in a vacancy rate that would equal or exceed the average annual (1970-1982) vacancy rate, but not the highest historical (1970-1982) annual vacancy rate.

- o **High Impact - Growth Cycle:** Project demand exceeds the projected baseline vacancy. Supply requirements (baseline and project) to meet additional demand would exceed the highest historical (1970-1982) annual production level. **Decline Cycle:** Excess supply resulting from decreases in project demand results in a vacancy rate that would exceed the highest historical (1970-1982) vacancy rate.

### 3.1.2.3 Determination of Significance Criteria

The context and the intensity of impacts are considered in the determination of significance as described in Sections 3.1.2.3.1 and 3.1.2.3.2 below. Significance is determined when all of the context criteria are relevant and at least one of the intensity criteria is relevant.

#### 3.1.2.3.1 Context

- o **Term -** Housing impacts are indicated as either short or long term.
- o **Location -** Housing impacts are identified as local.
- o **Affected interests -** The affected interests of the housing resources are identified as users and providers.

#### 3.1.2.3.2 Intensity

- o Impacts of price inflation (growth cycle) and price deflation (decline cycle) which exhibit some degree of uncertainty but which extend beyond a period of 2 consecutive years are considered severe.
- o Impacts which are likely to be highly controversial in the view of the users and providers.
- o Impacts which cause long-term shifts in the historic mix of housing types affecting housing market participants (providers and users).

### 3.1.2.4 Assumptions, Assumed Mitigations, and Environmental Impacts of the Proposed Action and Project Alternatives

**Assumptions.** Baseline housing forecasts were developed utilizing spatial allocation and housing models. The relationships between housing units and population were adjusted to reflect recent trends. The disaggregation of housing by type was modified to reflect housing composition in the forecast communities.

Net annual increases in housing demand by unit type for construction and operations personnel relative to baseline growth and vacancy in housing stock was projected for the impact communities. Housing impacts were developed on the basis of projected population allocation. Population-to-housing ratios, vacancy factors, housing composition, and other variables derived from recent construction workforce studies were utilized.

Population growth constitutes the basis and scope of housing supply requirements for the projected baseline. The population projections and geographic allocations generated in Section 3.1.1 are formulated on a community basis, employing spatial allocation techniques. The housing resource analysis is presented at the community level, and therefore all impacts are considered local.

Assumed Mitigations. The housing analysis assumes the following mitigations:

- o The Air Force will advocate that community impact assistance be provided to local governments to assist in mitigating impacts on housing;
- o All excess housing units constructed for project workers by the Air Force or its contractors will be disposed of after completion of the project in accordance with appropriate laws and regulations; and
- o Other potential mitigations that could be very effective are outside the authority of the Air Force to implement. However, the Air Force will cooperate with appropriate authorities in the establishment of land-use controls.

Environmental Impacts. Environmental impacts of the Proposed Action and project alternatives are discussed in the following sections.

#### 3.1.2.4.1 Cheyenne Urban Area

##### 3.1.2.4.1.1 Baseline Future - No Action Alternative

The Cheyenne Urban Area is projected to experience a housing supply growth rate from 1983 to 1992 of 19.4 percent, increasing from 25,899 dwelling units to 30,993 dwelling units. Annual percent increases for total year-round housing units range from a low 1.1 percent (to be experienced from 1983 to 1984) to a high of 2.3 percent (to be experienced from 1984 to 1985). Sixty-five percent of the housing stock is projected to be single-family homes, 23 percent multifamily, and 12 percent mobile homes. The temporary accommodations supply of 1,145 franchised hotel rooms, 897 nonfranchised hotel rooms, and 372 campground spaces will remain constant through the baseline future period.

The relative low net vacancy experienced from 1980 to 1982 is projected to continue through the baseline future period.

##### 3.1.2.4.1.2 Proposed Action

As summarized in Figures 3.1.2-1, 3.1.2-2 and 3.1.2-3, the Cheyenne Urban Area will experience growth cycle conditions from 1984 to 1987 for all housing categories (as a result of increases in project demand). Decline cycle conditions will occur from 1988 to 1992 for single-family, multifamily, and mobile home housing categories (as a result of decreases in project demand) with temporary accommodations category experiencing decline cycle conditions from 1988 to 1991. The Cheyenne Urban Area will experience net demand for housing from 1985 to 1992 with mobile homes the only housing category that will experience net demand for all years. Beneficial effects may result in the short term from decreases in vacancies in single family, multifamily, and mobile homes and higher occupancies in temporary accommodations.

Single-Family Housing. Beginning in 1983, the baseline supply of single-family units is projected to increase from approximately 16,860 units to 18,280 units in 1987, an increase of 1,420 units. The annual vacancy projected during this growth cycle is approximately 175 units.

Figure 3.1.2-1 demonstrates that project demands of 23 and 117 units in 1984 and 1985, respectively, can be satisfied by the supply of vacant units, resulting in a negligible, short-term, not significant impact.

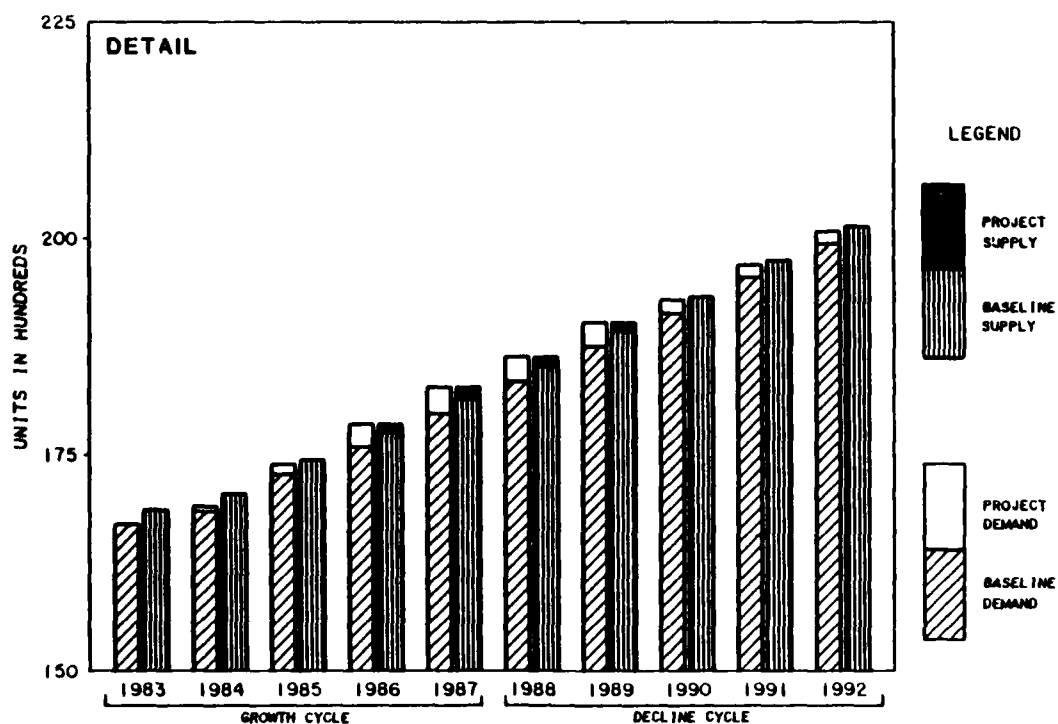
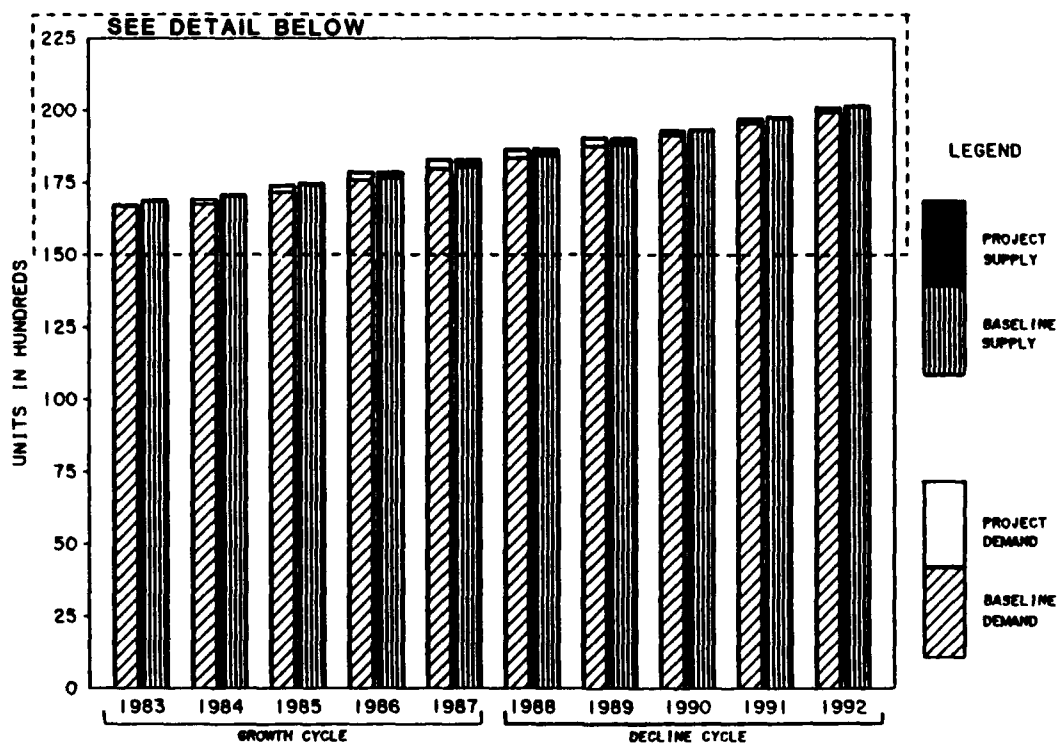


FIGURE 3.1.2-1 CHEYENNE URBAN AREA SINGLE-FAMILY HOUSING  
BASELINE AND PROJECT - SUPPLY AND DEMAND  
1983-1992

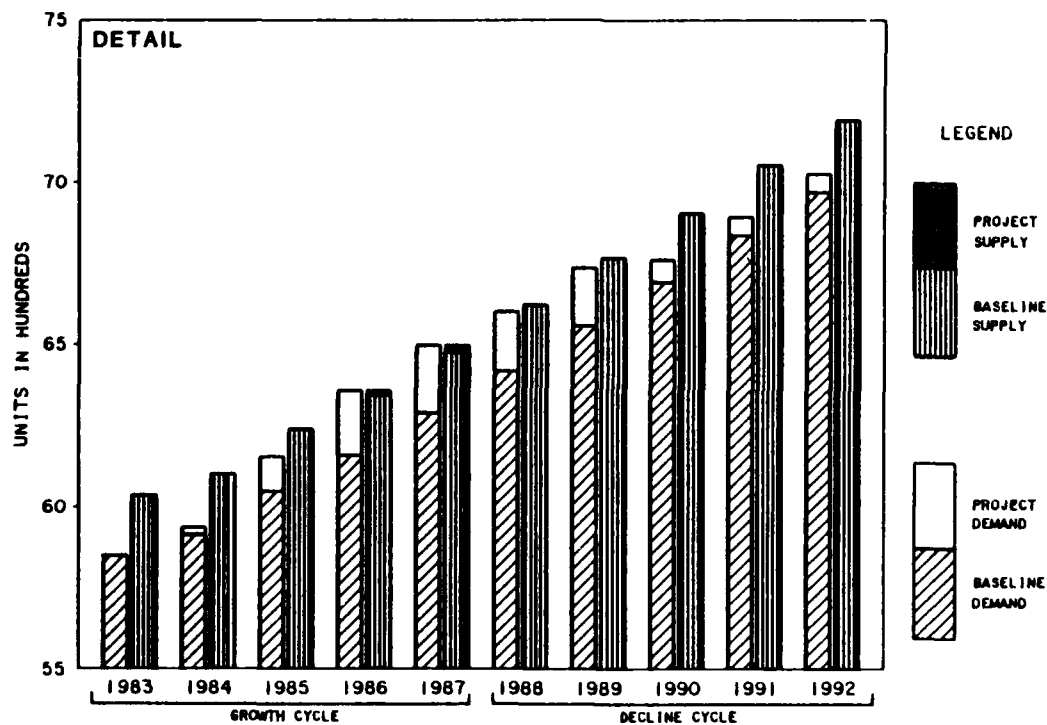
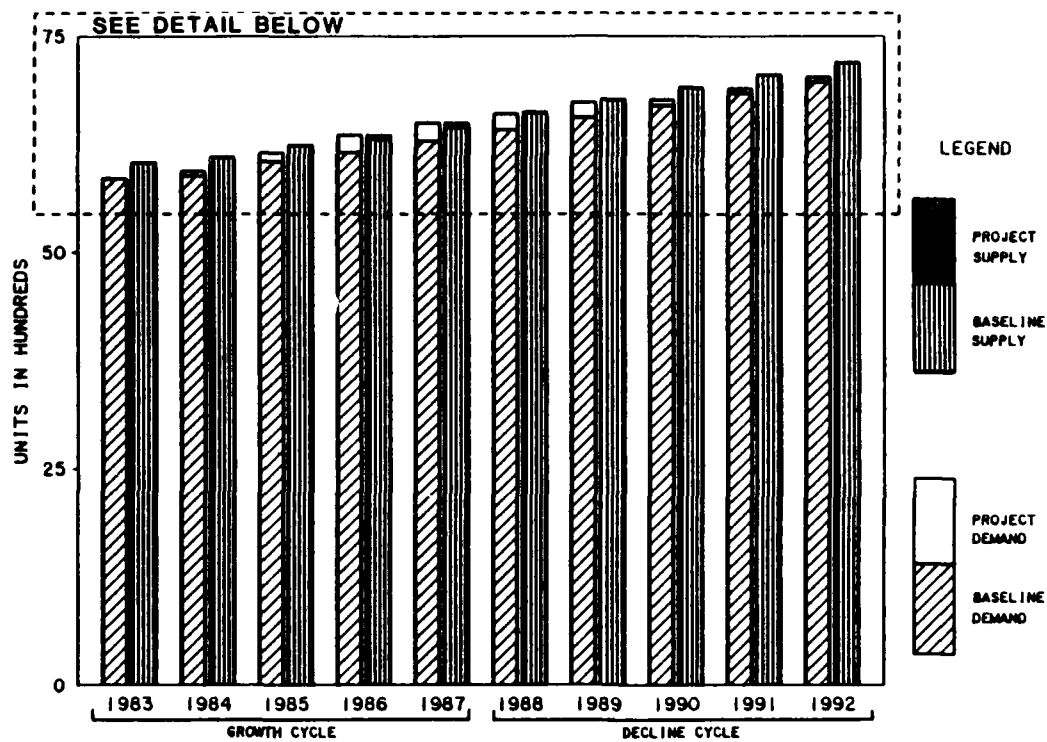


FIGURE 3.1.2-2 CHEYENNE URBAN AREA MULTIFAMILY HOUSING  
BASELINE AND PROJECT - SUPPLY AND DEMAND  
1983-1992

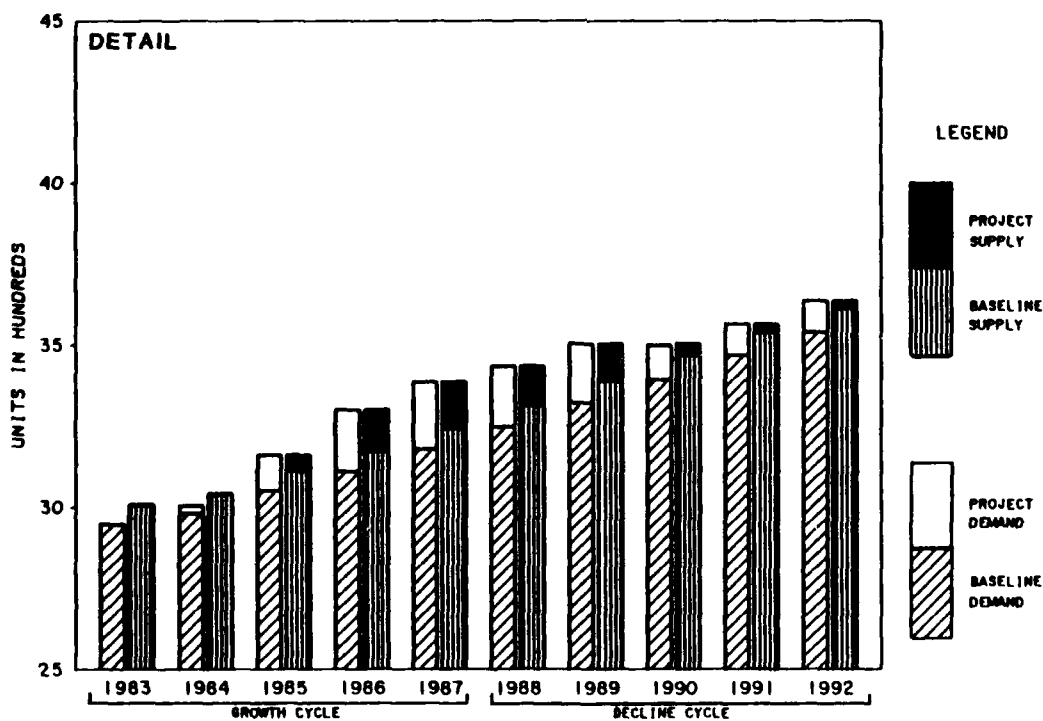
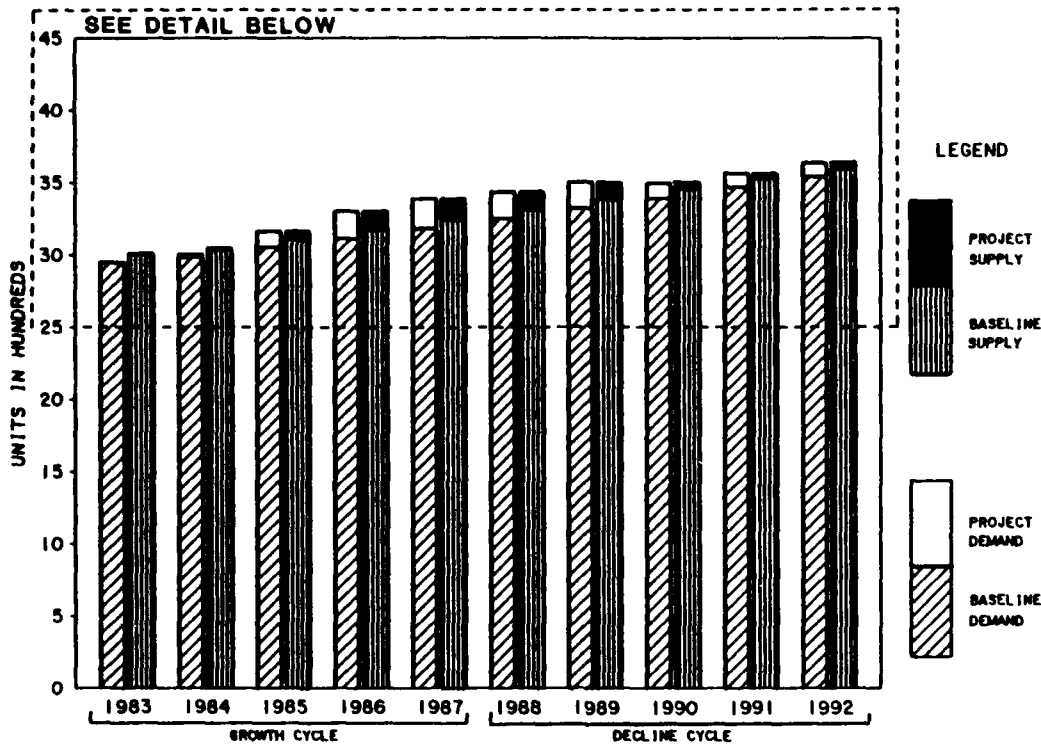


FIGURE 3.1.2-3 CHEYENNE URBAN AREA MOBILE HOME HOUSING  
BASELINE AND PROJECT - SUPPLY AND DEMAND  
1983-1992

In 1986 and 1987, project demands of 265 and 308 units, respectively, will exceed the projected vacancies by 93 and 40 units. Average annual production levels are projected to cover these project demands resulting in a low, short-term, not significant impact.

From 1988 through 1992, single-family housing will experience decline cycle conditions, whereby vacancies resulting from decreases in project demand will be absorbed by baseline demand, resulting in a negligible, long-duration, not significant impact.

Multifamily Housing. The baseline supply of multifamily housing is projected to increase from approximately 6,035 units in 1983 to 6,500 units in 1987, an increase of 465 units. The annual vacancy projected during this growth cycle is approximately 200 units.

Figure 3.1.2-2 indicates that project demands in 1984 and 1985 of 23 and 106 units, respectively, can be satisfied by vacant units, resulting in a negligible, short-term, not significant impact.

In 1986 and 1987, project demands of 200 and 208 units, respectively, will exceed the projected baseline vacancies. The projected supply additions of 6 and 3 units to meet this additional demand will not exceed the historic average annual production level, resulting in a low, short-term, not significant impact.

From 1988 through 1992, multifamily housing will experience decline cycle conditions, whereby vacancies resulting from decreases in project demand will be absorbed by baseline demand, resulting in a negligible, long-term, not significant impact.

Mobile Home Housing. Baseline mobile home supply is projected to increase from approximately 3,000 units in 1983 to 3,400 units in 1987, an increase of 400 units. The annual vacancy projected during this growth cycle is approximately 60 units.

Figure 3.1.2-3 demonstrates that project demand of 24 units in 1984 can be satisfied by the supply of vacant units, resulting in a negligible, short-term, not significant impact.

In 1985, 1986, and 1987, project demands of 109, 190, and 207 units, respectively, will exceed the projected baseline vacancies. The projected supply additions of 47, 80, and 15 units for these respective years to meet this additional demand will not exceed the historic average annual production level, resulting in a low, short-term, significant impact. (Significance is based on the projected supply additions that extend beyond a 2-year period with the possibility of price inflation.)

Mobile home housing from 1988 through 1992 will experience decline cycle conditions, whereby vacancies resulting from decreases in project demand will for the most part be absorbed by baseline demand, resulting in a negligible, long-duration, not significant impact.

Temporary Accommodations. The Cheyenne Urban Area will experience growth cycle conditions for the temporary accommodations category from 1984 to 1985, in which project demand will be satisfied by baseline vacancies, resulting in a negligible, short-term, not significant impact. Decline cycle conditions will be experienced from 1986 through 1990, when vacancies resulting from decreases in project demand will result in a negligible, short-term, not significant impact. No project demand will occur in 1991 or 1992.



Advance visitor reservations for hotel and motel rooms for Cheyenne Frontier Days and the Wyoming Legislative session will reduce the impacts of the project on these activities and could result in temporary relocation of construction workers during these periods. For those visitors relying on the availability of rooms without advance reservations, the high occupancy expected during these periods could result in visitor-related housing impacts.

#### 3.1.2.4.2 Town of Pine Bluffs

##### 3.1.2.4.2.1 Baseline Future - No Action Alternative

The town of Pine Bluffs is expected to experience a housing supply growth rate from 1983 to 1992 of 11.5 percent, increasing from 494 dwelling units to 551 dwelling units. Annual percent increases for total year-round housing units range from a low of 1.1 percent (to be experienced from 1988 to 1991) to a high of 1.4 percent (to be experienced from 1986 to 1987). Eighty percent of the housing stock is projected to be single-family homes, 10 percent multifamily, and 10 percent mobile homes. The temporary accommodations supply of 31 franchised hotel rooms, 17 nonfranchised hotel rooms, and 60 campground spaces will remain constant through the baseline future period.

##### 3.1.2.4.2.2 Proposed Action

The town of Pine Bluffs will experience growth cycle conditions in 1986 and 1988 for all housing categories (as a result of increases in project demand) and decline cycle conditions in 1987 and 1989 to 1992 for all housing categories (as a result of decreases in project demand). The town will experience net demand for housing for multifamily and mobile homes in 1986 and 1988. Beneficial effects may result in the short term from decreases in vacancies in single-family, multifamily, and mobile homes and higher occupancies in temporary accommodations.

Single-Family Housing. Single-family housing will experience growth cycle conditions in 1986 and 1988 (project demands of 1 and 16 units, respectively) as a result of project demand, which will be met by projected baseline vacancies, resulting in a negligible, short-term, not significant impact. Single-family housing will experience decline cycle conditions in 1987 and 1989 as a result of a decreased project demand resulting in a negligible, short-term, not significant impact.

Multifamily Housing. The baseline supply of multifamily housing is projected to increase from 50 units in 1985 to 67 units in 1988, an increase of 17 units. The annual vacancy projected during this growth cycle is approximately three units.

In 1986 and 1988, project demands of 4 and 17 units, respectively, will exceed the projected baseline vacancies. The projected supply additions of 1 and 14 units to meet this additional demand will exceed the highest historical production level for 1988, resulting in a high, short-term, not significant impact. (Note: In only 1 of 2 years is the highest historical production level exceeded.)

Multifamily housing will experience decline cycle conditions in 1987 and from 1989 to 1992, due to a decline in project demand to zero units, which will result in an excess supply of 13 units in 1989, 12 units in 1990 and 1991, and 11 units in 1992, whereby excess supply produces vacancies that exceed the highest historical vacancy rate, resulting in a high, long-duration, significant impact. (Significance is based on the projected excess supply that extends beyond a 2-year period with the possibility of price deflation.)

Mobile Home Housing. Baseline mobile home supply is projected to increase from approximately 50 units in 1985 to 65 units in 1988, an increase of 15 units. The annual vacancy projected during this growth cycle is zero.

In 1986 and 1988, project demands of 3 and 11 units, respectively, will exceed the projected baseline vacancies. The projected supply addition of 3 units in 1986 will approach the average annual production level, resulting in a low, short-term, not significant impact, while the projected supply addition of 9 units in 1988 will exceed the highest historical production level, resulting in a high, short-term, not significant impact.

Mobile home housing will experience decline cycle conditions in 1987 and from 1989 to 1992, due to a decline in project demand to zero units, which results in an excess supply of 2 units in 1987, 9 units in 1989, 8 units in 1990, and 7 units in 1991 and 1992, whereby excess supply produces vacancies that exceed the highest historical vacancy rate, resulting in a high, short-term, not significant impact in 1987, and a high, long-duration, significant impact from 1989 to 1992. (Significance is based on the projected excess supply that extends beyond a 2-year period with the possibility of price deflation.)

Temporary Accommodations. The town of Pine Bluffs will experience growth cycle conditions for the temporary accommodations category for 1986 and 1988, in which project demand will be satisfied by baseline vacancies, resulting in a negligible, short-term, not significant impact. Decline cycle conditions will be experienced in 1987 and 1989, in which vacancies resulting from decreases in project demand will result in a negligible, short-term, not significant impact. No project demand will occur from 1989 to 1992.

#### 3.1.2.4.3 Town of Wheatland

##### 3.1.2.4.3.1 Baseline Future - No Action Alternative

The town of Wheatland is expected to experience a housing supply growth rate from 1983 to 1992 of 12.8 percent, increasing from 2,009 dwelling units to 2,266 dwelling units. Annual percent increases for total year-round housing units range from a low of zero percent (to be experienced from 1983 to 1985) to a high of 2.8 percent (to be experienced from 1991 to 1992). Fifty-six percent of the housing stock is projected to be single-family homes, 18 percent multifamily, and 26 percent mobile homes. The temporary accommodations supply of 119 franchised hotel rooms, 61 nonfranchised hotel rooms, and 24 campground spaces will remain constant through the baseline future period.

##### 3.1.2.4.3.2 Proposed Action

The town of Wheatland will experience growth cycle conditions from 1985 to 1986 for single-family, multifamily and mobile home housing categories (as a result of increases in project demand), with temporary accommodations occurring only for 1985. Decline cycle conditions will occur from 1987 to 1988 for all housing categories, continuing to 1990 for mobile homes. Wheatland will only experience net demand for multifamily housing in 1986. Beneficial effects may result in the short term from decreases in vacancies in single family, multifamily, and mobile homes, and higher occupancies in temporary accommodations.

Single-Family Housing. Single-family housing will experience growth cycle conditions in 1985 and 1986 (project demand of 9 and 43 units, respectively) as a result of an increasing project demand, which will be met by projected baseline vacancies, resulting in a negligible, short-term, not significant impact. Single-family housing will experience decline cycle conditions in 1987 and 1988 as a result of a decreased project demand, resulting in a negligible, short-term, not significant impact.

**Multifamily Housing.** The baseline supply of multifamily housing is projected to increase from approximately 360 units in 1985 to 375 units in 1986, an increase of 15 units. The annual vacancy projected during this growth cycle is approximately 75 units.

In 1986 project demand of 48 units will exceed the projected baseline vacancies. The projected supply addition of 12 units to meet this additional demand will not exceed the historic average annual production level, resulting in a low, short-term, not significant impact.

Multifamily housing will experience decline cycle conditions from 1987 to 1990 due to a decrease in project demand and will result in an excess supply of 12 units in 1987, 10 units in 1988, and 1 unit in 1989 (which will be absorbed in 1990 by baseline growth), whereby excess supply produces vacancies that approach the historic average annual vacancy rate, resulting in a low, short-term, significant impact. (Significance is based on the projected excess supply that extends beyond a 2-year period with the possibility of price deflation.)

**Mobile Home Housing.** Mobile home housing will experience growth cycle conditions in 1985 and 1986 (project demand of 28 and 33 units, respectively) as a result of an increasing project demand, which will be met by projected baseline vacancies, resulting in a negligible, short-term, not significant impact. Mobile home housing will experience decline cycle conditions in 1987 and 1988 as a result of a decreased project demand, resulting in a negligible, short-term, not significant impact.

**Temporary Accommodations.** The town of Wheatland will experience growth cycle conditions for the temporary accommodations category for 1985, in which project demand will be absorbed by baseline vacancies, resulting in a negligible, short-term, not significant impact. Decline cycle conditions will be experienced from 1986 to 1988, in which vacancies resulting from decreases in project demand will result in a negligible, short-term, not significant impact. No project demand will occur from 1988 to 1992.

#### 3.1.2.4.4 Town of Chugwater

##### 3.1.2.4.4.1 Baseline Future - No Action Alternative

The town of Chugwater is expected to experience a housing supply growth rate from 1983 to 1992 of 33.9 percent, increasing from 112 dwelling units to 150 dwelling units. Annual percent increases for total year-round housing units range from a low of zero percent (to be experienced from 1991 to 1992) to a high of 4.5 percent (to be experienced from 1983 to 1984). Seventy-four percent of the housing stock is projected to be single-family homes, 9 percent multifamily, and 17 percent mobile homes. The temporary accommodations supply of 35 hotel rooms will remain constant through the baseline future period.

##### 3.1.2.4.4.2 Proposed Action

The town of Chugwater will experience growth cycle conditions from 1985 to 1986 for single-family and multifamily housing (as a result of increases in project demand), with decline cycle conditions occurring in 1988 for both housing categories (as a result of a decrease in project demand). Mobile home and temporary accommodations will experience growth cycle conditions in 1985, with decline cycle conditions occurring from 1986 to 1988. The town will only experience net demand for mobile homes from 1985 to 1987. Beneficial effects may result in the short term from decreases in vacancies in single family, multifamily, and mobile homes, and higher occupancies in temporary accommodations.

Single-Family Housing. Single-family housing will experience growth cycle conditions in 1985 and 1986 (project demand of 4 and 6 units, respectively) as a result of an increasing project demand, which will be met by projected baseline vacancies, resulting in a negligible, short-term, not significant impact. Single-family housing will experience decline cycle conditions in 1988 as a result of a decreased project demand resulting in a negligible, short-term, not significant impact.

Multifamily Housing. Multifamily housing will experience growth cycle conditions in 1985 and 1986 (project demand of 5 and 6 units, respectively) as a result of an increasing project demand, which will be met by projected baseline vacancies, resulting in a negligible, short-term, not significant impact. Multifamily housing will experience decline cycle conditions in 1988 as a result of a decreased project demand, resulting in a negligible, short-term, not significant impact.

Mobile Home Housing. Baseline mobile home supply is projected to increase from 20 units in 1984 to 26 units in 1985. The annual vacancy projected during this growth cycle is zero.

In 1985 project demand of six units will exceed the projected baseline vacancies. The projected supply addition of six units to meet this additional demand will exceed the highest historical production level, resulting in a high, short-term, not significant impact.

Mobile home housing will experience decline cycle conditions from 1986 to 1988 due to a decrease in project demand, resulting in an excess supply of one unit in 1986 and 1987 (which will be absorbed in 1988 by baseline growth). Although excess supply will produce a vacancy that exceeds the highest historical vacancy rate, resulting in a high, short-term, not significant impact, one unit is considered to be within the range of probability of error for the projection of a vacancy rate. In this instance, the impact for mobile homes in the decline cycle is rated as a negligible, short-term, not significant level.

Temporary Accommodations. The town of Chugwater will experience growth cycle conditions for the temporary accommodations category for 1985, in which project demand will be absorbed by baseline vacancies, resulting in a negligible, short-term, not significant impact. Decline cycle conditions will be experienced from 1986 to 1988, in which vacancies resulting from decreases in project demand will result in a negligible, short-term, not significant impact. No project demand will occur from 1988 to 1992.

#### 3.1.2.4.5 City of Kimball

##### 3.1.2.4.5.1 Baseline Future - No Action Alternative

The city of Kimball is expected to experience a housing supply growth rate from 1983 to 1992 of 2.6 percent, increasing from 1,276 dwelling units to 1,309 dwelling units. Annual percent increases for total year-round housing units range from a low of zero percent (to be experienced from 1983 to 1984) to a high of 0.4 percent (to be experienced from 1984 to 1985). Seventy-one percent of the housing stock is projected to be single-family homes, 18 percent multifamily, and 11 percent mobile homes. The temporary accommodations supply of 75 franchised hotel rooms, 151 nonfranchised hotel rooms, and 71 campground spaces will remain constant through the baseline future period.

##### 3.1.2.4.5.2 Proposed Action

The city of Kimball will experience growth cycle conditions for all housing categories in 1987 and 1989, with single family experiencing growth cycle conditions in 1988. Decline cycle conditions will be experienced in 1988 for all housing categories with the exception of single

family, and in 1990 for all housing categories. The city will only experience net demand for mobile homes in 1987 and 1989. Beneficial effects may result in the short term from decreases in vacancies in single family, multifamily, and mobile homes, and higher occupancies in temporary accommodations.

Single-Family Housing. Single-family housing will experience growth cycle conditions from 1987 to 1989 (project demand of 28 and 30 units, respectively) as a result of an increasing project demand, which will be met by projected baseline vacancies, resulting in a negligible, short-term, not significant impact. Single-family housing will experience decline cycle conditions in 1990 as a result of a decreased project demand, and will result in a negligible, short-term, not significant impact.

Multifamily Housing. Multifamily housing will experience growth cycle conditions in 1987 and 1989 (project demand of 11 and 31 units, respectively) as a result of an increasing project demand, which will be met by projected baseline vacancies, resulting in a negligible, short-term, not significant impact. Multifamily housing will experience decline cycle conditions in 1988 and 1990 as a result of a decreased project demand, and will result in a negligible, short-term, not significant impact.

Mobile Home Housing. Baseline mobile home supply is projected to increase from approximately 140 units in 1986 to 150 units 1989. The annual vacancy projected during this growth cycle is approximately ten units.

In 1987 and 1989, project demands of 9 and 18 units, respectively, will exceed the projected baseline vacancies. The projected supply addition of one unit in 1987 will be inconsequential, resulting in a negligible, short-term, not significant impact, while the projected supply addition of eight units in 1989 will exceed the highest historical production level, resulting in a high, short-term, not significant impact.

Mobile home housing will experience decline cycle conditions in 1988 and 1990 to 1992 due to a decrease in project demand, resulting in an excess supply of one unit in 1988, eight units in 1990, and seven units in 1991 and 1992, whereby excess supply produces vacancies that approach the historical average annual vacancy rates, resulting in a low, long-duration, significant impact. (Significance is based on the projected excess supply that extends beyond a 2-year period with the possibility of price deflation.)

Temporary Accommodations. The city of Kimball will experience growth cycle conditions for the temporary accommodations category in 1987 and 1989, in which project demand will be absorbed by baseline vacancies, resulting in a negligible, short-term, not significant impact. Decline cycle conditions will be experienced in 1988 and 1990 due to vacancies resulting from a decrease in project demand, resulting in a negligible, short-term, not significant impact. No project demand will occur from 1990 to 1992.

#### 3.1.2.4.6 Consideration of Alternatives

As no changes in population impacts are anticipated due to dispatch station, onbase roads, or cable alternatives (Section 3.1.1.4.2), no variation in housing impacts are projected.

### 3.1.2.5 Summary of Impacts

#### 3.1.2.5.1 Explanation of Detailed Impact Matrix

Figure 3.1.2-4 summarizes the level of impact and significance ratings for each housing type (single family, multifamily, mobile home, and temporary accommodations) and for the five jurisdictions (Cheyenne Urban Area; towns of Pine Bluffs, Wheatland, and Chugwater; and the city of Kimball) by the housing resource. All impacts are considered local. Beneficial effects may result in the short term from decreases in vacancies in the affected communities in single family, multifamily and mobile homes and higher occupancies in temporary accommodations.

##### 3.1.2.5.1.1 Cheyenne Urban Area

Single-family, multifamily, and mobile home housing in the Cheyenne Urban Area will experience low and short-term impacts during the growth and decline cycles. During the growth cycle, project demand exceeds the projected vacancy but the required supply will not exceed historic average annual production levels. During the decline cycle, excess supply resulting from decreases in project demand results in an increase in the net vacancy rate, approaching but not exceeding the average annual net vacancy rate.

Impacts are short term because they do not extend beyond the construction period of the Proposed Action. Single-family and multifamily impacts are considered not significant. Mobile home impacts are deemed significant as a result of their duration (greater than 2 years) with the possibility of minor price inflation.








##### 3.1.2.5.1.2 Town of Pine Bluffs

Multifamily and mobile home housing in the town of Pine Bluffs will experience high, short-term, and not significant impacts during the growth cycle when project demand exceeds the projected vacancy and the required supply exceeds the highest historical production levels. These impacts are short term because they do not extend beyond the construction period of the Proposed Action.

Multifamily and mobile home housing will experience high, long-term, and significant impacts during the decline cycle when excess supply resulting from decreases in project demand results in a vacancy rate that exceeds the highest historical vacancy rate. These impacts are long duration because they extend beyond the construction period of the Proposed Action and are deemed significant as a result of their duration (greater than 2 years) with the possibility of price deflation.

##### 3.1.2.5.1.3 Town of Wheatland

Multifamily housing in the town of Wheatland will experience low, short-term, and not significant impacts during the growth cycle when project demand exceeds the projected vacancy but the required supply will not exceed historic average annual production levels. Multifamily housing will experience low, short-term, and significant impacts during the decline cycle when excess supply resulting from a decrease in project demand results in an increase in the vacancy rate that approaches but does not exceed the historic average annual vacancy rate. This decline cycle impact is deemed significant as a result of its duration (greater than 2 years) with the possibility of price deflation. These impacts are short term because they do not extend beyond the construction period of the Proposed Action.

LEGEND		ADVERSE IMPACTS	SIGNIFICANT ADVERSE IMPACTS
LEVEL OF IMPACT*	LOW		
	MODERATE		
	HIGH		
POTENTIAL BENEFICIAL EFFECTS			
* MEASURE OF THE AMOUNT OF ENVIRONMENTAL CHANGE			

PROJECT IMPACTS					
SHORT TERM			LONG TERM		
SITE	LOCAL	REGIONAL	SITE	LOCAL	REGIONAL
HOUSING	○				
Cheyenne Urban Area	○				
Single Family	○				
Multifamily	○				
Mobile Home	●				
Temporary Accommodations					
Town of Pine Bluffs	○			●	
Single Family					
Multifamily	○			●	
Mobile Home	○			●	
Temporary Accommodations					
Town of Wheatland					
Single Family					
Multifamily	●				
Mobile Home					
Temporary Accommodations					

Note: <sup>1</sup> Impacts are those generated by construction activities and having a long duration.

FIGURE 3.1.2-4 HOUSING SUMMARY IMPACT MATRIX

[illegible]

**FIGURE 3.1.2-4 Continued      HOUSING SUMMARY IMPACT MATRIX**



#### 3.1.2.5.1.4 Town of Chugwater

Mobile home housing in the town of Chugwater will experience high, short-term, not significant impacts during the growth cycle and negligible, short-term, not significant impacts during the decline cycle. During the growth cycle, project demand exceeds the projected vacancy and the required supply exceeds the highest historical production level. During the decline cycle, impacts that result from excess supply have been adjusted to reflect a more realistic vacancy condition. Impacts are short term because they do not extend beyond the construction period of the Proposed Action.

#### 3.1.2.5.1.5 City of Kimball

Mobile home housing in the city of Kimball will experience high, short-term, and not significant impacts during the growth cycle when project demand exceeds the projected vacancy and the required supply exceeds the highest historical production levels. These impacts are short term because they do not extend beyond the construction period of the Proposed Action.

Mobile home housing will experience low, long-term, and significant impacts during the decline cycle when excess supply resulting from a decrease in project demand results in an increase in the vacancy rate that approaches but does not exceed the historic average annual vacancy rate. This decline cycle impact is deemed significant as a result of its duration (greater than 2 years) with the possibility of price deflation. This impact is considered long duration because it extends beyond the construction period of the Proposed Action.

#### 3.1.2.5.2 Aggregation of Elements, Impacts, and Significance

The housing resource for the Areas of Concentrated Study will experience low and not significant impacts overall in the short-term, and negligible and not significant impacts in the long term. Beneficial effects may result in the short term from decreases in vacancies in single family, multifamily, and mobile homes, and higher occupancies in temporary accommodations.

The aggregation of impact and significance ratings for housing types or subelements to the housing resource or element level for each jurisdiction, and the aggregation of the housing resource for each jurisdiction to the housing resource level for the Areas of Concentrated Study are based on professional experience and judgment. This includes the qualitative consideration of such factors as size of housing stock in a jurisdiction relative to the other jurisdictions, the mix of housing within each jurisdiction and housing impacts of each subelement relative to the mix, the historical market response to supply and demand pressures, and an assessment of the capabilities of housing providers.

#### 3.1.2.6 Mitigation Measures

Potential mitigation or preventive measures to be considered are identified below by community. Each measure identifies the party responsible to implement the mitigation, but not necessarily the party paying for the measure.

##### 3.1.2.6.1 Cheyenne Urban Area

- o Housing demand forecasts should be produced and widely distributed within the public domain (providing buyer profile for type, size, price range, amenities, etc.). This mitigation information will be effective in estimating projected needs by type and amounts and should be released and/or implemented 12 months or a building

season prior to construction start-up and updated when a major change in conditions occurs. The agency responsible for implementing this mitigation is the Air Force.

- o Continuous monthly forecasting and monitoring of housing demand and housing starts for Cheyenne during the growth cycle. This mitigation will be effective in estimating project needs by type and amount, and should assist the public and private sectors to react accordingly, utilizing the best available information. The parties responsible for implementing this mitigation measure are the Air Force and appropriate public agencies.
- o Local officials should review and amend, if necessary, development regulations which may increase the cost of housing to the consumer but not necessarily the quality of the unit or the amenities within the subdivision or development. This mitigation will be effective in evaluating standards (which may be excessive, adding unnecessarily to housing costs) governing housing densities and type, design specifications for streets, sidewalks, curbs, and gutters, as well as requirements for parking, open space, and drainage. The parties responsible for implementing these mitigation measures are the local public officials.
- o Underwriting requirements for the Federal Housing Administration (FHA), Veterans Administration (VA), Federal Home Loan Mortgage Corporation, Federal National Mortgage Association, Wyoming Community Development Authority, and Wyoming State Treasurer's Mortgage Purchase Program should be reviewed by local government relative to standards found in local development regulations. An incentive should be offered to builders and developers participating in these programs. This mitigation will be effective in opening up the secondary mortgage market for developers, builders, and buyers. The parties responsible for implementing this mitigation measure are the local public officials.
- o Local government should review and update land development and annexation policies in light of housing demands created by the project. Regulations pertaining to the design, construction, and operation of mobile home and recreational vehicle parks should be developed and adopted to accommodate both permanent and temporary parks. This mitigation will be effective in amending land development policies that take into consideration major projects. The parties responsible for implementing this mitigation measure are the local public officials.

#### 3.1.2.6.2 Town of Pine Bluffs, Wheatland; City of Kimball

- o Housing demand forecasts should be produced and widely distributed within the public domain (providing buyer profile for type, size, price range, amenities, etc.). This mitigation information will be effective in estimating projected needs by type and amount and should be released and/or implemented 12 months or a building season prior to construction start-up and updated when a major change in conditions occurs. The agency responsible for implementing this mitigation is the Air Force.
- o Continuous monthly forecasting and monitoring of housing demand and housing starts during the growth cycle. This mitigation will be effective in estimating projected needs by type and amount and should assist the public and private sectors to react accordingly utilizing the best available information. The parties responsible for implementing this mitigation measure are the Air Force and appropriate public agencies.

- o Underwriting requirements for the Federal Housing Administration (FHA), Veterans Administration (VA), Federal Home Loan Mortgage Corporation, Federal National Mortgage Association, Wyoming Community Development Authority, and Wyoming State Treasurer's Mortgage Purchase Program should be reviewed by local government relative to standards found in local development regulations. An incentive should be offered to builders and developers participating in these programs. This mitigation will be effective in opening up the secondary mortgage market for developers, builders and buyers. The parties responsible for implementing this mitigation measure are the local public officials.

#### 3.1.2.6.3 Town of Chugwater

- o Housing demand forecasts should be produced and widely distributed within the public domain (providing buyer profile for type, size, price range, amenities, etc.). This mitigation information will be effective in estimating projected needs by type and amount and should be released and/or implemented 12 months or a building season prior to construction start-up and updated when a major change in conditions occurs. The agency responsible for implementing this mitigation is the Air Force.
- o Continuous monthly forecasting and monitoring of housing demand and housing starts during the growth cycle. This mitigation will be effective in estimating projected needs by type and amount and should assist the public and private sectors to react accordingly, utilizing the best available information. The parties responsible for implementing this mitigation measure are the Air Force and appropriate public agencies.

#### 3.1.2.7 Unavoidable Adverse Impacts

Unavoidable adverse impacts are those remaining impacts which cannot be thoroughly negated by mitigation measures.

- o Increased demand pressures leading to increases in housing costs and rental prices could occur during the short term or period of construction activity. These pressures will most likely be reduced for the long term or operational period of the project.
- o Decreases in demand after the construction period leading to excess supply in mobile homes and multifamily units resulting in increases in vacancies. This condition will most likely occur during the decline cycle and for both short and long-term impacts.
- o Depressed market conditions for mobile homes with decline in values. This condition will occur with the increases in vacancies noted previously and will typically represent decline cycle conditions of long-term impacts.

#### 3.1.2.8 Irreversible and Irretrievable Resource Commitments

Housing resources would not experience irreversible and irretrievable resource commitments.

**3.1.2.9    The Relationship Between Local Short-Term Use of Man's Environment  
and Maintenance and Enhancement of Long-Term Productivity**

The commitment of housing resources is necessary to the maintenance and enhancement of long-term productivity. The analysis of housing resources indicates short-term impacts as a result of increases in supply and vacancies during growth and decline cycles.

### **3.1.3      Public Finance**

#### **3.1.3.1    Introduction**

The public finance analysis presented within this environmental impact statement represents one of two fiscal studies that have been prepared for the assessment of the fiscal impacts that are projected to result from the Peacekeeper in Minuteman Silos project. A separate Fiscal Impact Analysis, prepared by the Office of Economic Adjustment of the Department of Defense, has been prepared specifically for the purpose of identifying the types, dollar amounts and timing of Federal assistance that may be required to offset the local fiscal impacts of the project. The differences in analytical approaches and forecasts of these two fiscal studies are discussed below.

The public finance analysis presents an evaluation of the fiscal effects of population growth (either baseline or project-related) on the existing budgetary patterns of the identified political jurisdictions within the Area of Concentrated Study. The forecasted levels of revenues and expenditures are determined in constant FY 1982-83 dollars representing the continuation of sources and population-related levels of revenues, and similarly, the maintenance of existing relative levels of expenditures for provided services. Modification of these forecasts is applied only when it is specifically stated for project impacts or when changes in the patterns for revenues and expenditures are those specifically identified by a jurisdiction, e.g., a planned tax or rate change, or an adopted capital project or service-level improvement program.

Impact expenditures are evaluated on the basis of baseline per capita costs plus extraordinary requirements as determined by the service delivery increases discussed within the public services and utilities resource sections of this document. The result of the public finance analysis is thus one which allows current local official decisionmakers and project planners to evaluate the impact of the project within the context of existing fiscal conditions. As such, the projections contained in this section are meant to portray impacts on local governments as if fiscal conditions, tax policies, and government programs remain constant at their present conditions and levels. The public finance analysis makes this examination in order to determine the effects of the project in lieu of any specific mitigation efforts by local governments or the proponent. This is not to suggest, however, that no mitigation efforts will be undertaken. This is done to assess the potential needs local governments might have for which mitigations can then be assessed and evaluated.

The Fiscal Impact Analysis, prepared by the Office of Economic Adjustments, extends the considerations and conclusions of the public finance analysis to include the specific difficulties of revenue-expenditure lag, advanced depreciation, acceleration of capital requirements, and activity-specific project-induced costs in its evaluation of the projected expenditure impacts of the project upon the affected jurisdictions.

The Area of Concentrated Study for public finance consists of communities and geographically and politically distinct areas that experience project-attributable growth that approaches or exceeds baseline projected growth by approximately 5 percent in any given year based on immigrant population allocation. The Area of Concentrated Study consists of the following governmental entities:

- o      Laramie County, Wyoming;
- o      The City of Cheyenne, Wyoming;
- o      Town of Pine Bluffs, Wyoming;

- o Laramie County School District No. 1;
- o Laramie County School District No. 2;
- o South Cheyenne Water & Sewer District;
- o City of Cheyenne Board of Public Utilities, Sewer and Waterworks fund;
- o Platte County, Wyoming;
- o Town of Wheatland, Wyoming;
- o Town of Chugwater, Wyoming;
- o Platte County School District No. 1;
- o Kimball County, Nebraska;
- o City of Kimball, Nebraska;
- o City of Kimball combined Utilities Fund;
- o Kimball County High School District No. 1; and
- o Kimball County Elementary School District No. 3.

School districts and county governments were included in the public finance Area of Concentrated Study, as were contiguous urban service districts when population increases of municipalities within their service areas triggered the criteria stated above.

### 3.1.3.2 Definition of Levels of Impacts

Impacts for public finance are classified in terms of revenues and expenditures. Short term is defined as the construction period of the project extending from 1984 through the first quarter of 1990. Long-term impacts are those occurring during the operational phase of the project beginning in 1990. The specific duration of these impacts over 1 or more budget years will be specified within the analysis for each jurisdiction. Information in this section is based upon data and detailed analysis contained in the Socioeconomic Environmental Planning Technical Report.

- o Negligible Impact - Will cause a change in expenditures which is offset by an equivalent change in revenues attributable to the project.
- o Low Impact - Will cause a revenue-expenditure imbalance attributable to the project resulting in necessary reductions in cash balances.
- o Moderate Impact - The project will cause a public entity to raise fees or tax rates or lower expenditure levels.
- o High Impact - The project would necessitate a change in existing fiscal policy or tax structures or cause a public entity to incur bonded indebtedness.

### 3.1.3.3 Determination of Significance Criteria

If any of the following conditions are present, the impact is considered significant:

- o Where the fiscal impact is likely to be highly controversial;
- o Where the impact impairs the ability of a governmental entity to pay for services involving the public health, safety, or welfare;
- o Where the impact is highly uncertain or involves unique or unknown risks;
- o Where the impact impairs the ability of a governmental entity to repair, replace, or expand an already inadequate facility; and/or
- o Where the action or its impact threaten the violation of federal, state, or local law.

### 3.1.3.4 Assumptions, Assumed Mitigations, and Environmental Impacts of the Proposed Action and Project Alternatives

For the No Action Alternative, expenditures were projected using a constant service level and an adjusted incremental cost approach. Categorical expenditures were adjusted to reflect planned or anticipated changes in service levels and capital facility improvements. For purposes of this analysis, unless noted otherwise, expenditures include all identified programmatic, categorical, operating administrative, and debt retirement expenditures of the governmental entity being examined.

Revenues were projected specific to each revenue source. Adjustments were based upon recent changes in state law in Nebraska and Wyoming, and the most recent disbursements of mineral royalty and severance tax revenues in Wyoming. For purposes of this analysis, unless otherwise noted, revenues represent all noncapital-borrowing proceeds, including cash balances and interest/investment earnings identified for the governmental entity being examined.

The 3-percent Wyoming state sales and use tax and the 1-percent local option sales and use tax were projected using regression analysis of taxable sales and use base over the last 10 years against changes in personal income and projected on the same basis. Of this amount, project-related construction materials subject to the Wyoming sales and use tax amount to \$696,640 for Laramie County governmental jurisdictions and \$71,090 for Platte County jurisdictions over the construction phase of the project.

Debt service requirements were identified as well as borrowing capacity based on statutory limitations.

For the Proposed Action, revenues and expenditures were projected in a similar manner with adjustments made to reflect impact conditions. Additional debt service and other impacts causing changes in expenditure levels identified within the public services and facilities section of this document, as well as increased revenues as a result of the project, were included. The Community Impact Assistance Payment from the State of Wyoming to the City of Cheyenne, Laramie County, and the Town of Pine Bluffs was also calculated and added to gross revenues for those jurisdictions.

**Assumptions.** For the public finance analysis, the following assumptions apply:

- o State and local laws and fiscal policies governing local finance will remain unchanged unless otherwise noted.
- o Sales tax calculations are considered as worst case because the federal government may permit itself to be taxed for centrally procured systems components. See the fiscal impact analysis for detail.
- o The high range of staffing levels as identified within the public services and facilities section of this document was used when it deviated from the per capita or per unit method.
- o All taxes owed state and local government will be paid in a timely manner, consistent with existing procedures.
- o The 1-percent local option sales and use tax presently in effect for Laramie County will remain in effect.

**Assumed Mitigations.** For the public finance analysis, the following assumed mitigations apply:

- o The State of Wyoming will continue to make Impact Assistance Payments to eligible Laramie County jurisdictions in a manner prescribed by law.
- o All construction-related purchases of supplies, materials, and equipment are made by contractors or subcontractors and are therefore subject to sales and use taxes.
- o Public Law 81-874 impact payments to school districts continue at the most recent 1982 to 1983 amounts per eligible student throughout the projection period.

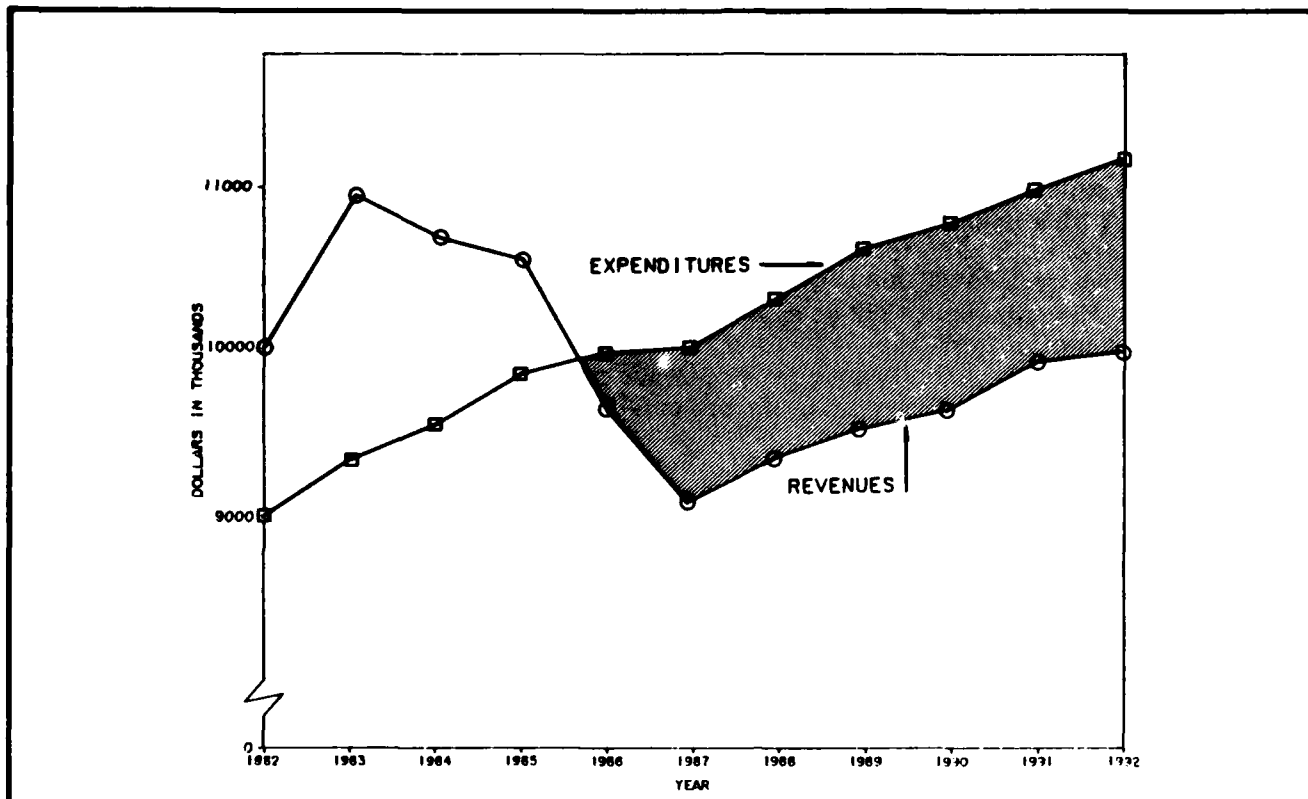
**Environmental Impacts.** Environmental impacts of the Proposed Action and project alternatives are discussed in the following sections.

3.1.3.4.1 Laramie County, Wyoming

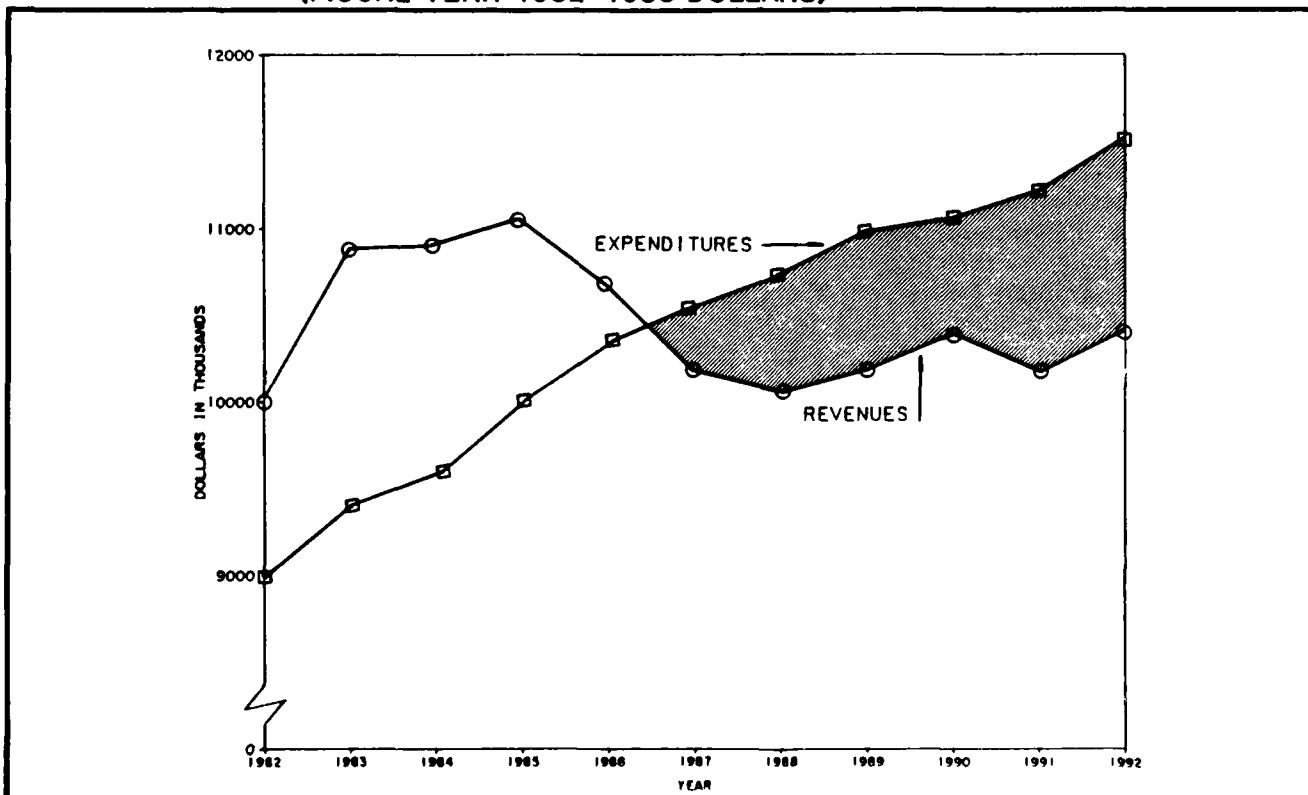
3.1.3.4.1.1 Baseline Future - No Action Alternative

Revenue and expenditure projections for the No Action Alternative are presented in Figure 3.1.3-1. Laramie County's fiscal outlook will be characterized by tight conditions beginning in 1986 when expenditures exceed revenues by \$226,553. This imbalance will increase to \$1,075,547 by 1992 if current spending levels are maintained. As a result of this imbalance, the county may have to redirect its revenues or cut back its spending to avoid financial difficulty. Major revenue sources will continue to be the local jurisdictions share of the 3-percent sales and use tax, the local jurisdictions share of the 1-percent local option sales and use tax, and the property tax. Capital expenditures are anticipated to include \$60,000 for remodeling the Sheriff's department in 1985 and \$7,156,500 for the county's share of the City/County Jail in 1986. Debt service for the Laramie County's share of this facility will approach \$527,787. If the mill levy for the county building fund is continued by the voters after 1985, it is likely it would be applied to this amount.





**FIGURE 3.1.3-1 REVENUE AND EXPENDITURE PROJECTIONS, LARAMIE COUNTY - NO ACTION (FISCAL YEAR 1982-1983 DOLLARS)**



**FIGURE 3.1.3-2 REVENUE AND EXPENDITURE PROJECTIONS, LARAMIE COUNTY - PROPOSED ACTION (FISCAL YEAR 1982-1983 DOLLARS)**

#### 3.1.3.4.1.2

#### Proposed Action

Under the Proposed Action, fiscal conditions will be somewhat better than those predicted for the baseline. The Proposed Action is expected to add \$4.46 million to county revenue while requiring the expenditure of \$1.86 million. As a result, the County will experience a net gain of approximately \$2.6 million during the impact period. The revenue expenditure imbalance of \$226,553 projected in 1986 for the baseline will disappear because of the Wyoming Impact Assistance payment of \$278,000 in that year. However, the imbalance conditions projected for the baseline will reappear in 1987 as expenditure increases surpass revenues. In that year, the revenue expenditure imbalance will total \$265,515 compared to \$963,299 under baseline conditions. The pattern of imbalances will continue through 1992. Revenues and expenditures for the Proposed Action Alternative are projected and shown in Figure 3.1.3-2 (preceding page).

Well over one-half of the projected \$2.4 million in increased impact revenue will come from the Wyoming Impact Assistance Payment from the state. Other major increases will include \$496,000 from the local share of both the 3-percent and 1-percent sales and use taxes due to project-related increases in personal income, retail sales, and construction activity.

Public finance impacts will be beneficial as revenues attributable to the project exceed expenditures in all years.

#### 3.1.3.4.2

#### City of Cheyenne, Wyoming

##### 3.1.3.4.2.1

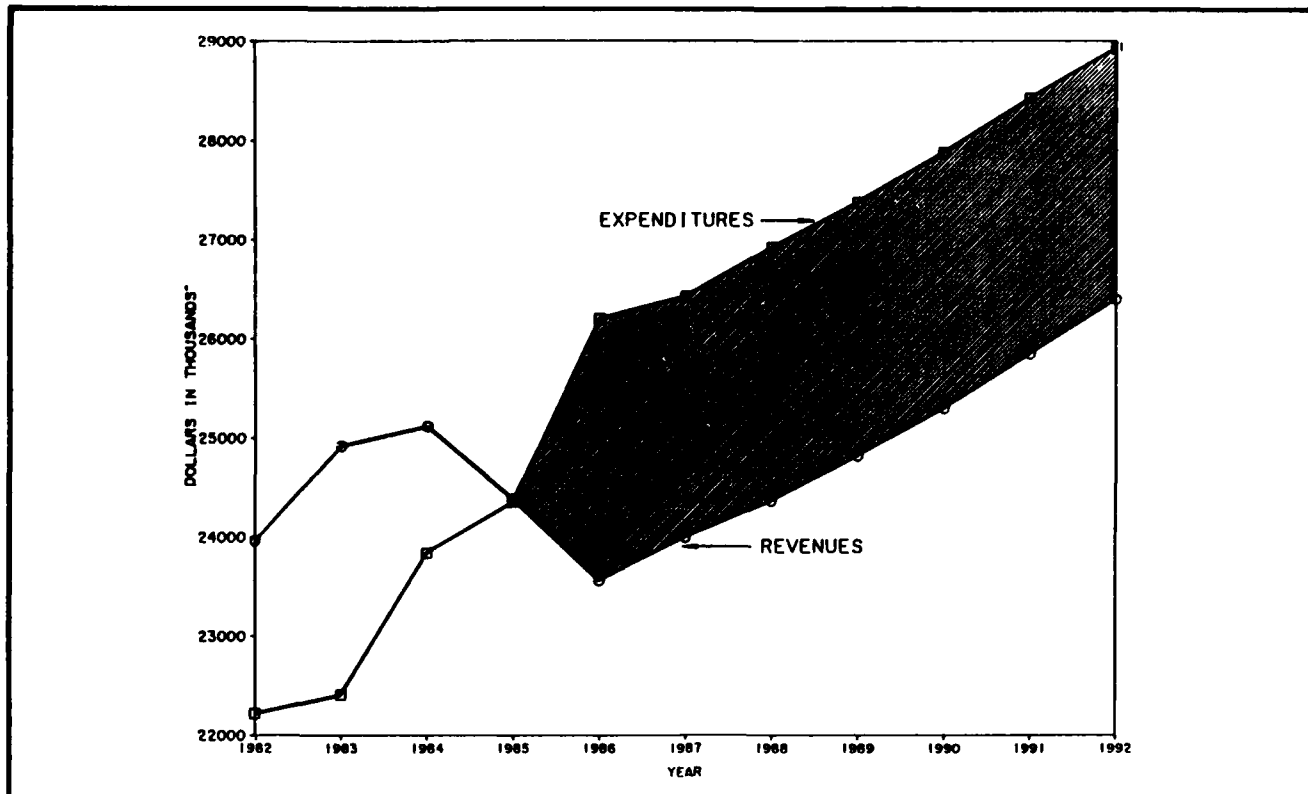
##### Baseline Future - No Action Alternative

Revenues and expenditures are presented for the No Action Alternative in Figure 3.1.3-3 for the City of Cheyenne. As indicated by the figure, the period 1983 to 1992 will be characterized by increasingly tight fiscal conditions as revenue growth of less than 6 percent will be exceeded by expenditure growth of 29.1 percent. This trend, if it persists, will result in revenue expenditure imbalances of \$2,633,906 in 1986, falling to \$2.5 million by the end of the study period. Since the state constitution requires local governments to maintain balanced budgets, either spending will have to be reduced or taxes and fees will have to be increased. Planned capital expenditures will contribute substantially to projected expenditure increases. City contributions to the Stage II water project and the joint City/County Jail alone will increase expenditures by \$1.37 million per year. Capital outlays for refuse handling and fire protection will add to this amount. Overall, capital outlays will more than double during the project period, rising from \$1.19 million in 1984 to \$2.67 million by 1992. Noncapital expenditures will increase by 18.9 percent during the same period.

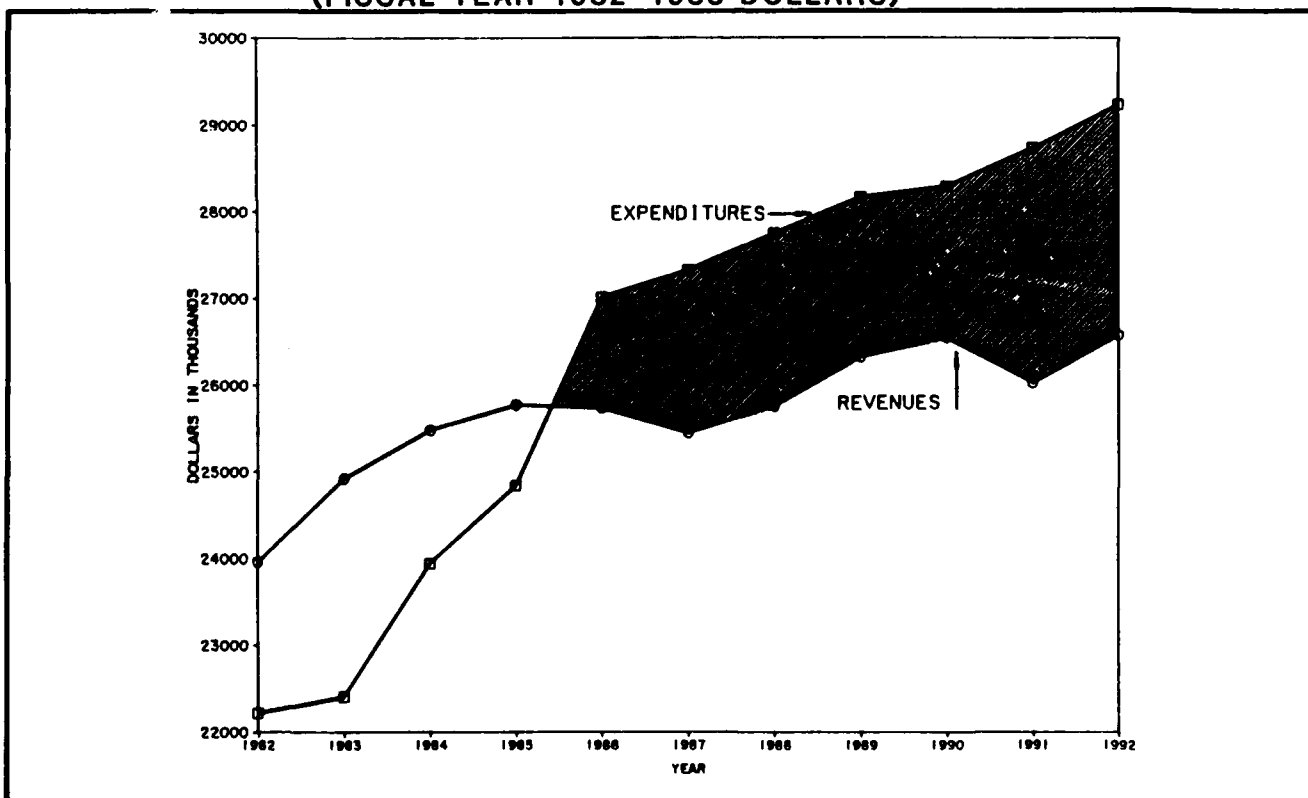
##### 3.1.3.4.2.2

##### Proposed Action

Revenues and expenditures for the Proposed Action are presented in Figure 3.1.3-4 for the City of Cheyenne. Over the projection period, revenues will increase by \$9.84 million and expenditures will increase by \$4.93 million. Projected revenue-expenditure imbalances present under baseline conditions will be smaller under Proposed Action conditions. The City would avoid a revenue expenditure imbalance for one additional year as a result of an Impact Assistance Payment of \$591,501 in 1985 from the State of Wyoming. This presents beneficial effects for the City of Cheyenne. The City may have to reduce expenditure levels, but this is a result of baseline conditions. Total revenues resulting from the Wyoming Impact Assistance Payment over the life of the project are \$5.26 million. By 1991, revenue-expenditure imbalances are greater under the Proposed Action than the No Action Alternative. This is due to expiration of the Wyoming Impact Assistance Payment. Prior to 1991 Proposed Action imbalances are smaller due to the excess of impact generated revenues over expenditures.



**FIGURE 3.1.3-3 REVENUE AND EXPENDITURES PROJECTIONS, CITY OF CHEYENNE - NO ACTION (FISCAL YEAR 1982-1983 DOLLARS)**



**FIGURE 3.1.3-4 REVENUE AND EXPENDITURE PROJECTIONS, CITY OF CHEYENNE - PROPOSED ACTION (FISCAL YEAR 1982-1983 DOLLARS)**

The fiscal impacts on the City of Cheyenne are expected to be potentially beneficial in the short term because changes in expenditures are more than offset by changes in revenue. Beneficial effects in these years should result from net increases in revenues. In the long term, impacts would be negligible and not significant.

### 3.1.3.4.3 Pine Bluffs, Wyoming

#### 3.1.3.4.3.1 Baseline Future - No Action Alternative

Revenue and expenditure projections for the No Action Alternative are presented in Figure 3.1.3-5. Between 1983 and 1992, revenues will exceed expenditures by a substantial margin in absolute terms and in growth rates. Revenue increases are expected in the amount of \$672,964, an increase of 68.2 percent over 1983. Expenditures will rise by \$244,163, an increase of 33.8 percent. The severance tax will continue to be the largest source of nonenterprise fund revenue followed by the local share of the 3-percent and 1-percent local option sales and use tax, community services user fees, and the property tax. Enterprise funds exist for electric, water, sewer, and trash. Each fund is projected to remain sound during the study period. Pine Bluffs is not projected to increase bonded debt during the study period. Its present bonded debt is zero, although outstanding loans in the amount of \$651,875 for water projects will require annual payments of \$46,894 to the State Farm Board and the Farmers Home Administration.

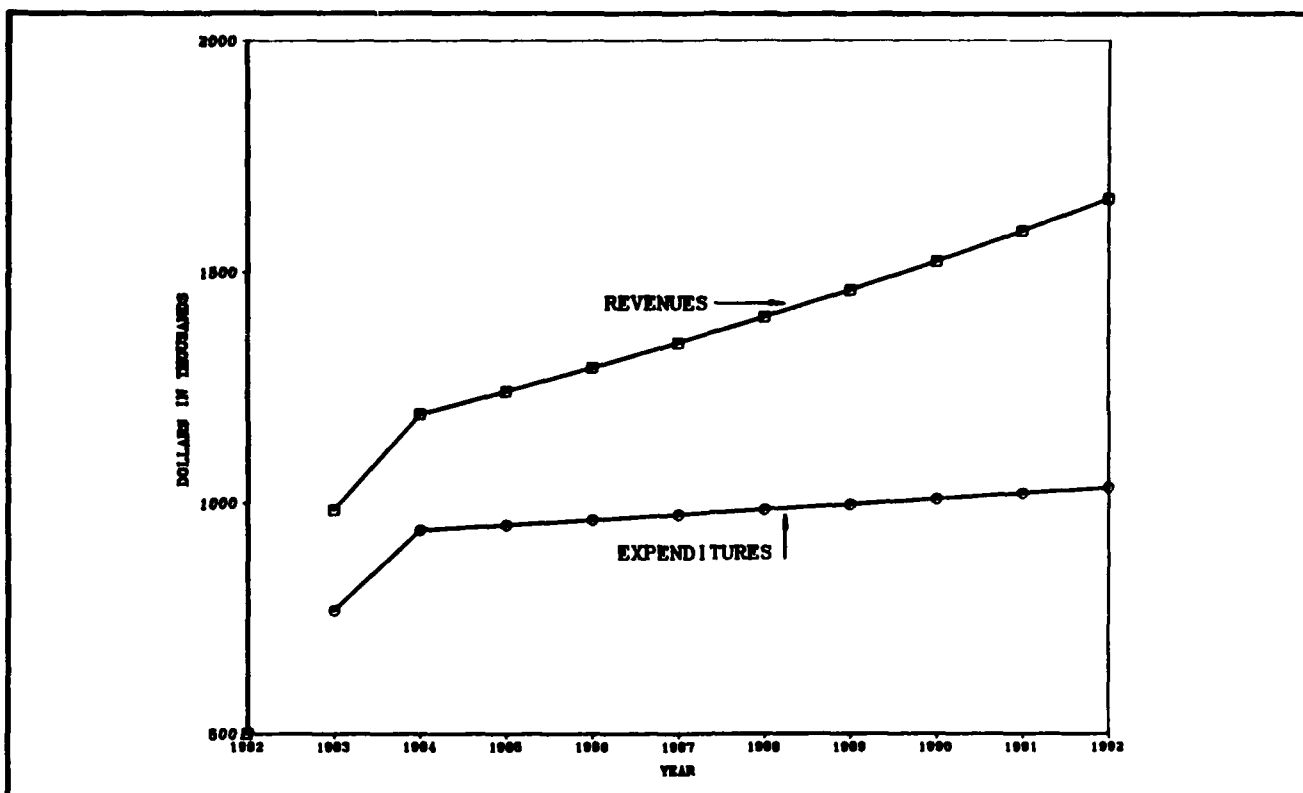
#### 3.1.3.4.3.2 Proposed Action

Under the Proposed Action, the Town of Pine Bluffs will be more fiscally stable than under the No Action Alternative. The Proposed Action will generate an additional \$492,074 while causing expenditures of only \$138,477. Under Proposed Action conditions, the rate of total revenue increase will be 74.3 percent compared to 68.2 percent for the No Action Alternative. Expenditures will increase by the same percentage (34.4 percent) as in the No Action Alternative between 1983 and 1992. The Wyoming Impact-Assistance Payment increases revenues by \$23,375 and the local share of the 3-percent and 1-percent optional sales and use tax will bring in an additional \$25,000. Expenditure increases of \$19,782 and \$118,695 will occur in 1986 and 1988 respectively. Projected revenues and expenditures for the Town of Pine Bluffs are presented in Figure 3.1.3-6. Impacts are considered to be potentially beneficial because revenue increases are greater than expenditures.

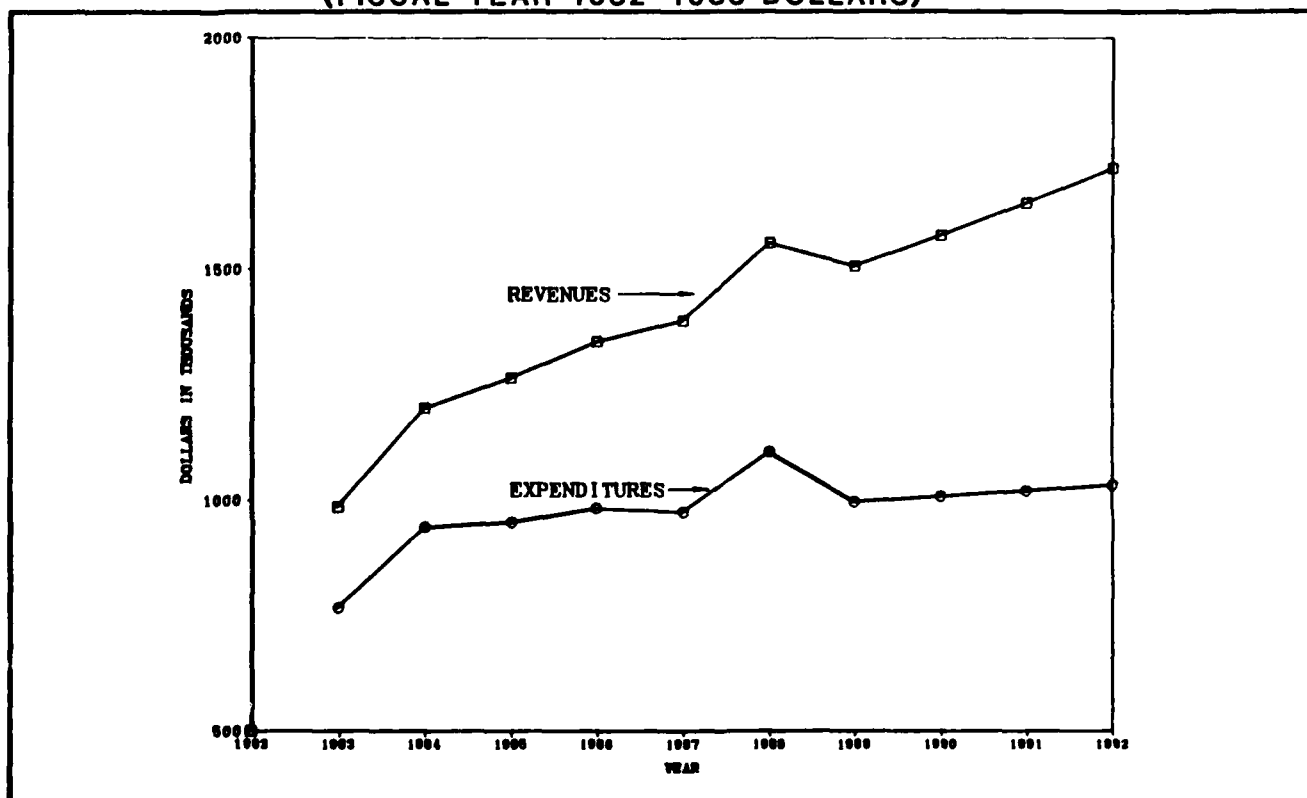
### 3.1.3.4.4 Laramie County School District No. 1

#### 3.1.3.4.4.1 Baseline Future - No Action Alternative

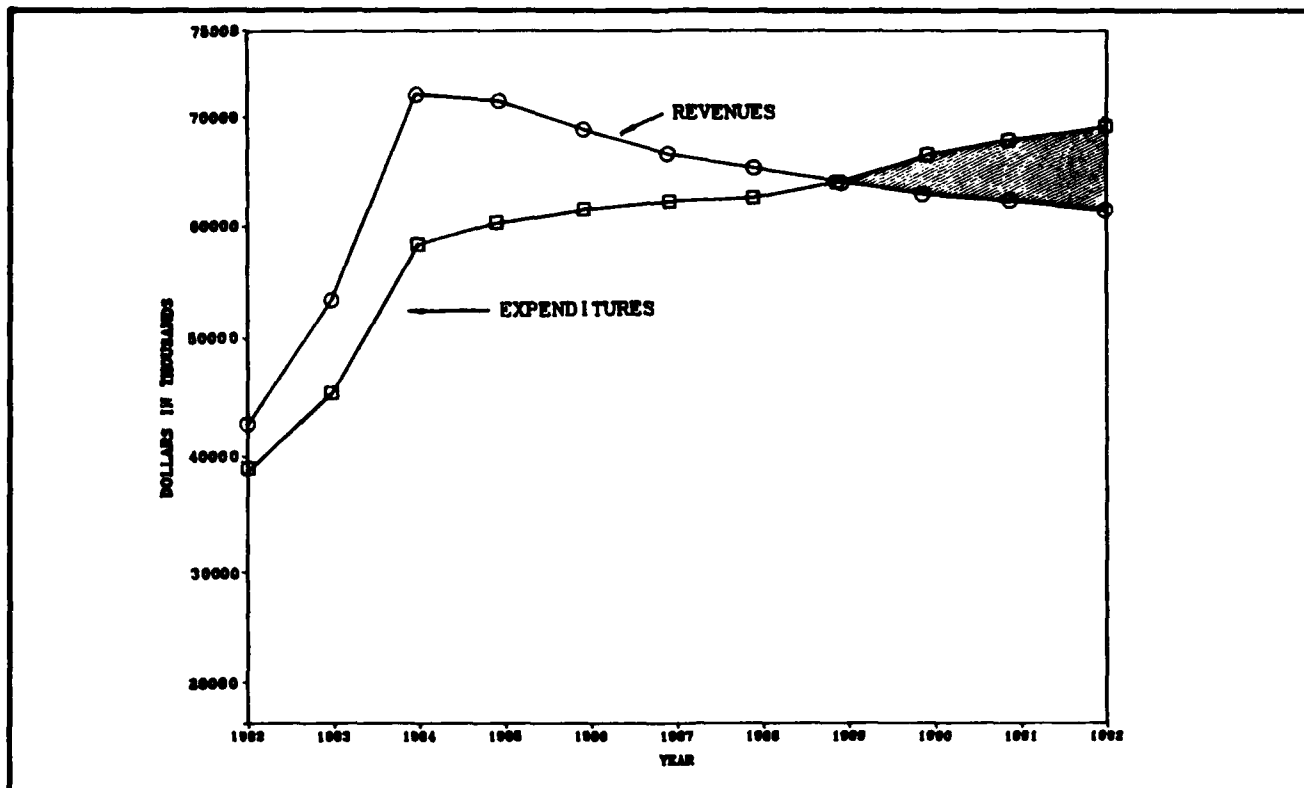
Revenue and expenditure projections are presented for the period 1983 to 1992 under the No Action Alternative in Figure 3.1.3-7. Laramie County School District No. 1 will operate under tight fiscal conditions as revenues peak in FY 1984 at approximately \$74 million (including capital proceeds from conversion of a loan from the State Farm Board to long-term general obligation bonded indebtedness) to approximately \$63 million in 1992. Expenditures are projected to increase from approximately \$61 million to \$70 million in the same time period. As such, a revenue-expenditure imbalance is created in FY 1989 and thereafter when expenditures exceed gross revenues. The accumulation of cash balances and reserves from prior years allow the District to defer the imbalance until then. Revenues will fluctuate early in the study period due to enrollment changes, variations in the number of state-recognized classroom units and changes in the entitlement formula of the State Foundation Program. The county 12 mill levy will also drop to 6 mills in 1984, causing a further loss of revenues. The



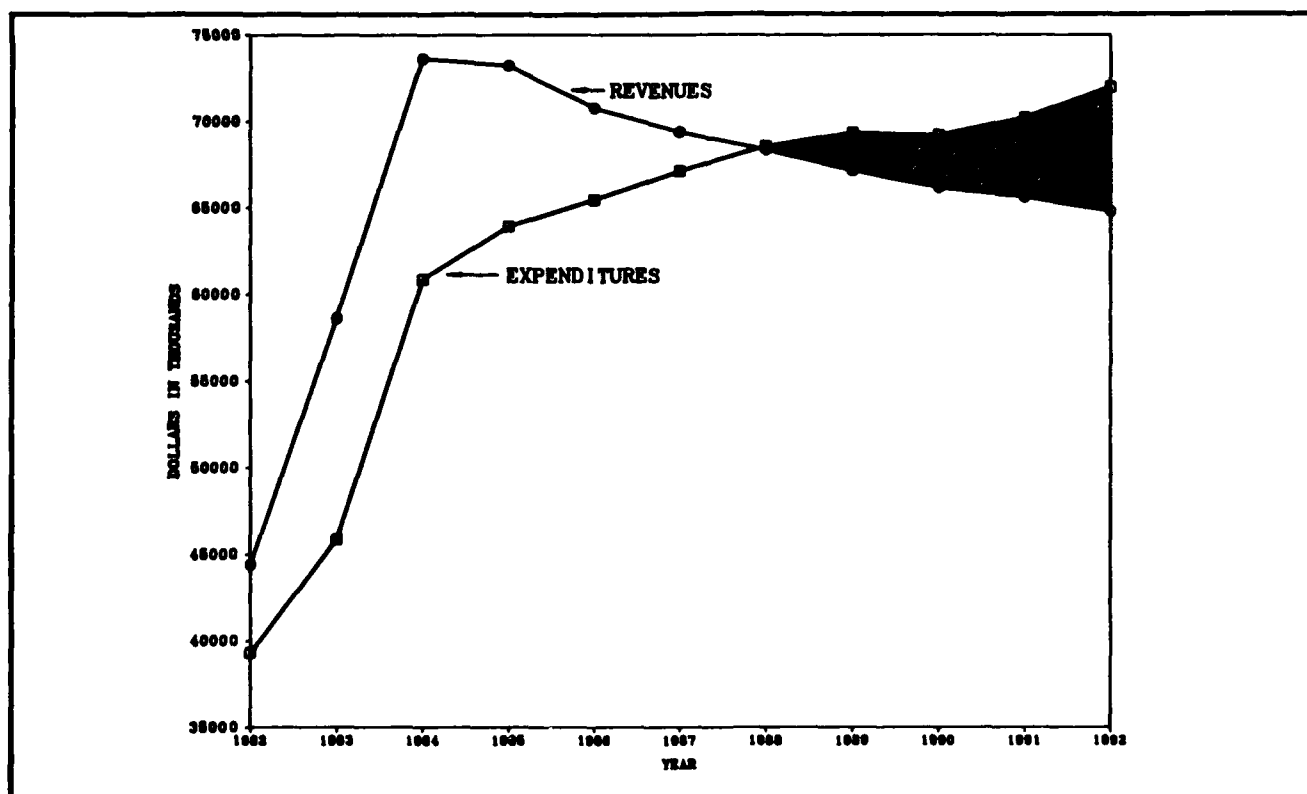
**FIGURE 3.1.3-5 REVENUE AND EXPENDITURE PROJECTIONS, TOWN OF PINE BLUFFS - NO ACTION (FISCAL YEAR 1982-1983 DOLLARS)**



**FIGURE 3.1.3-6 REVENUE AND EXPENDITURE PROJECTIONS, TOWN OF PINE BLUFFS - PROPOSED ACTION (FISCAL YEAR 1982-1983 DOLLARS)**



**FIGURE 3.1.3-7 REVENUE AND EXPENDITURE PROJECTIONS, LARAMIE COUNTY SCHOOL DISTRICT NO. 1 - NO ACTION (FISCAL YEAR 1982-1983 DOLLARS)**



**FIGURE 3.1.3-8 REVENUE AND EXPENDITURE PROJECTIONS, LARAMIE COUNTY SCHOOL DISTRICT NO. 1 - PROPOSED ACTION (FISCAL YEAR 1982-1983 DOLLARS)**

future status of the State Foundation Program will emerge as a critical fiscal issue for the District. Enactment of one of the eight proposals currently pending before the Wyoming Legislature could add to future State Foundation Program revenues.

In 1983, the District increased its outstanding bonded debt by \$4.5 million to finance the construction of an additional school building. Expenditures for general maintenance and operation will more than double by 1992. Utilization of historically high levels of bonded debt utilization is expected to continue .

#### 3.1.3.4.2 Proposed Action

Total revenues in Laramie County School District No. 1 will continue to exceed expenditures, but the margin of the excess will decline from that projected for the baseline condition. Increased revenues associated with the Proposed Action will total \$10,700,000 while increased expenditures resulting from higher enrollment will total \$17,400,000. As a result, the District will experience a net loss of \$6,670,000 during the impact period. Cash balances under the Proposed Action condition will also be consistently lower because the margin by which expenditures exceed net revenue will rise during high impact years. As a result of the Proposed Action, the District will nearly deplete cash balances by 1991 and cash reserves by 1992, 1 year earlier than the baseline projection. The District will also experience a revenue expenditure imbalance by 1988, also 1 year earlier than under baseline conditions. This imbalance will grow to \$7.17 million by 1992.

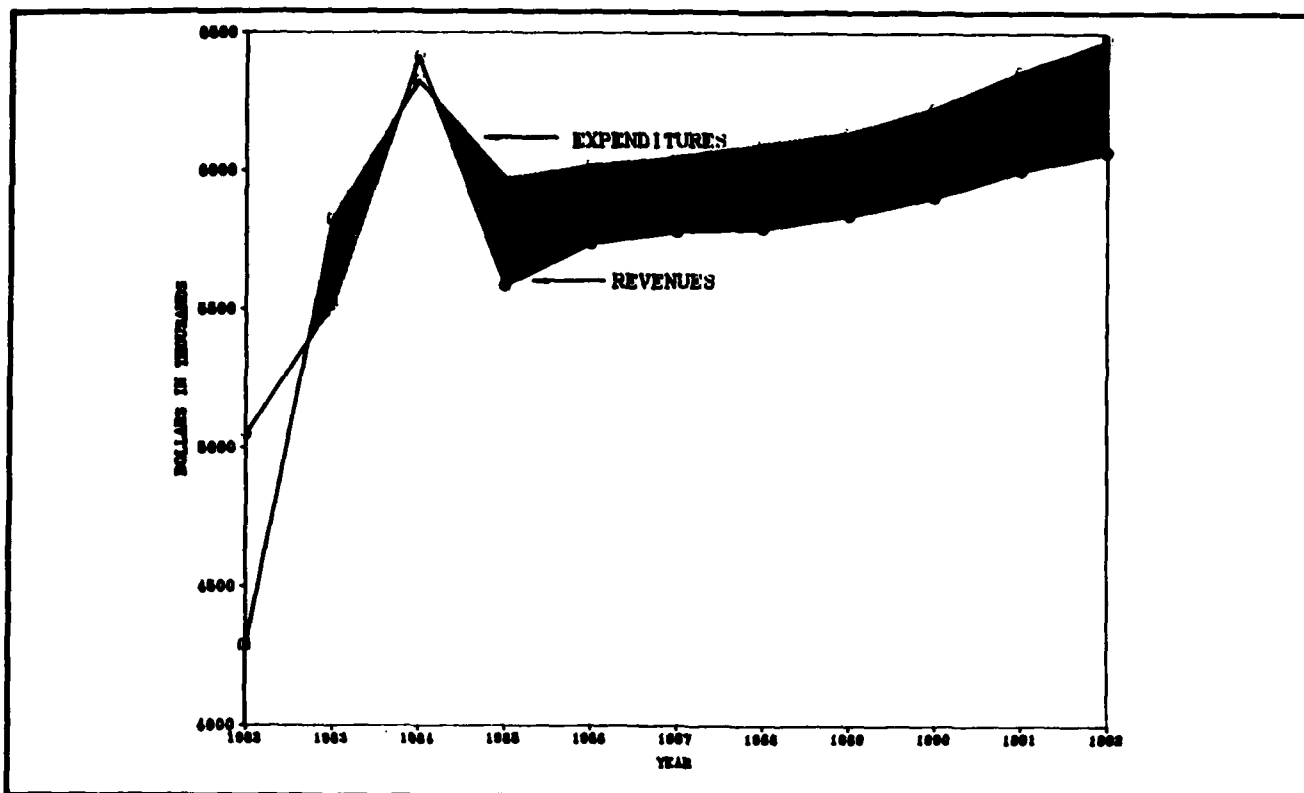
Additional impact-related expenditures of \$17,430,000 can be expected over the study period. Of this, \$2,454,288 will pay for the construction of an additional school building to serve project-induced enrollees. In addition, 5 additional school buses costing a total of \$175,000 will be purchased under the Proposed Action, also to serve project-induced enrollees. Instruction expenditures will rise by \$10,300,000 during the study period, while administrative expenditures will rise by \$4,430,000.

Fiscal impacts to Laramie County School District No. 1 are considered short term, high, and significant because the project will cause the District to raise taxes fees, or reduce services 1 year earlier than would be necessary under baseline conditions, as well as increase bonded indebtedness. This impact is considered significant because any tax increase for the school district would be necessary and highly controversial and without such an increase public educational services would be jeopardized. Since baseline growth and project operations-related enrollments (220 students) will utilize the construction stage required facilities with corresponding levels of operational expenditures and revenues, the long term fiscal impact will be negligible and not significant. Projected revenues and expenditures for the Proposed Action are presented in Figure 3.1.3-8 (preceding page).

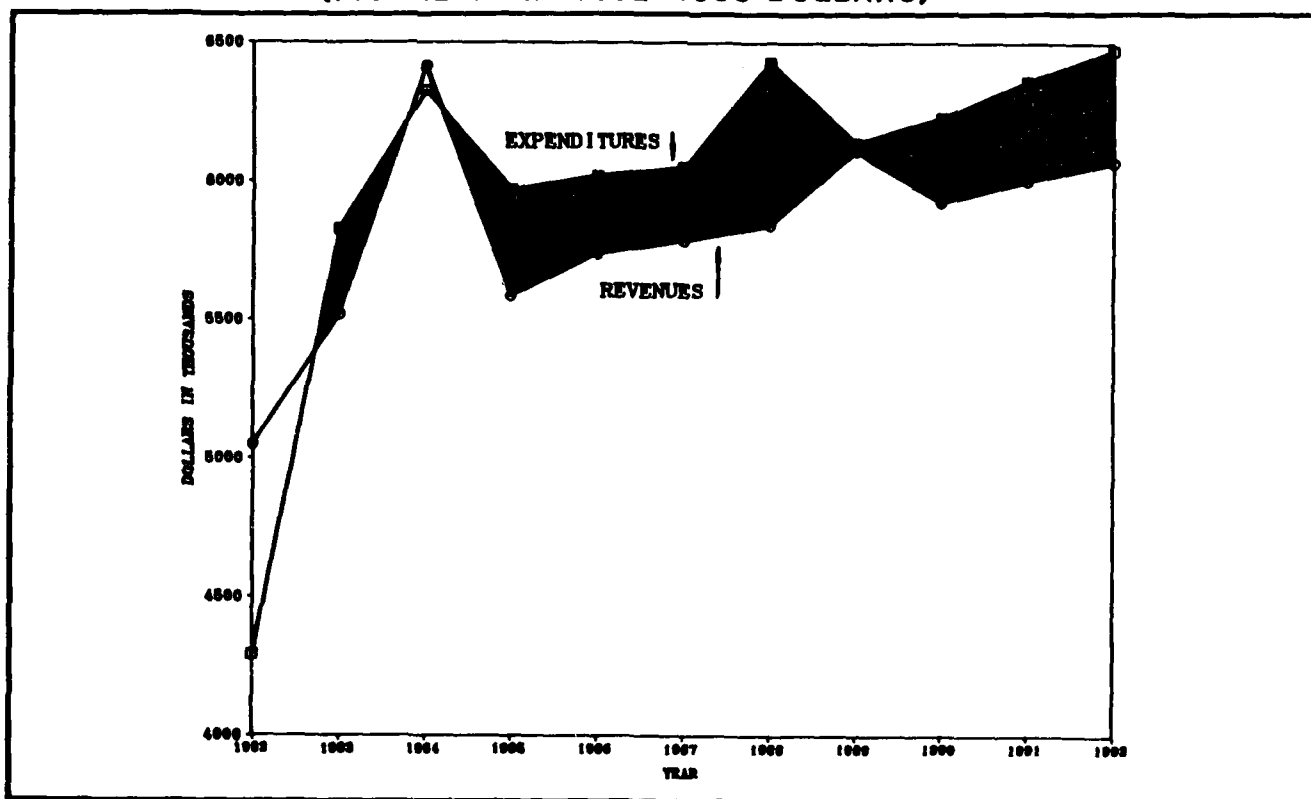
#### 3.1.3.4.5 Laramie County School District No. 2

##### 3.1.3.4.5.1 Baseline Future - No Action Alternative

Revenue Expenditure projections are presented by Figure 3.1.3-9 for the No Action Alternative. District No. 2 will experience revenue expenditure imbalance in every year except 1984 due to the more rapid growth of expenditures over revenues. Revenue shortfalls will increase in magnitude from \$267,014 in 1987 to \$404,604 by 1992. Revenues will fluctuate early in the study period due to enrollment changes, losses in the number of state-recognized classroom units, changes in the entitlement formula of the State Foundation Program, and a drop in the county mill levy from 12 to 6. The future status of the State Foundation Program emerges as a critical issue for District No. 2. Enactment of one of the eight proposals to



**FIGURE 3.1.3-9 REVENUE AND EXPENDITURE PROJECTIONS, LARAMIE COUNTY SCHOOL DISTRICT NO. 2 - NO ACTION (FISCAL YEAR 1982-1983 DOLLARS)**



**FIGURE 3.1.3-10 REVENUE AND EXPENDITURE PROJECTIONS, LARAMIE COUNTY SCHOOL DISTRICT NO. 2 - PROPOSED ACTION (FISCAL YEAR 1982-1983 DOLLARS)**



upwardly modify the entitlement formula currently pending before the Wyoming Legislature could ease the District's financial difficulty. The District will retire its outstanding bonded debt by 1989. No additional bond issues are contemplated.

#### 3.1.3.4.5.2 Proposed Action

The Proposed Action will have little net impact on the fiscal stability of Laramie County School District No. 2 because of the even rise of additional revenue and expenditures projected to occur over the study period. The School District is projected to gain approximately \$337,659 in additional revenue as a result of the Proposed Action between 1984 and 1992. During the same period, expenditure increases will total \$332,338. As a result, the District will experience a net gain of \$5,321. The revenue and expenditure imbalances predicted for baseline conditions will continue to hold there; imbalances will prevail in every year except 1984. Impact-related revenues will accrue to the district between 1988 and 1992. Impact-related expenditures will occur between 1988 and 1992.

The fiscal impact of the Proposed Action on Laramie County No. 2 is negligible and not significant in the short and long term because expenditure increases will be offset by equivalent increases in revenue. Revenue and expenditure projections for the Proposed Action are presented in Figure 3.1.3-10 (preceding page).

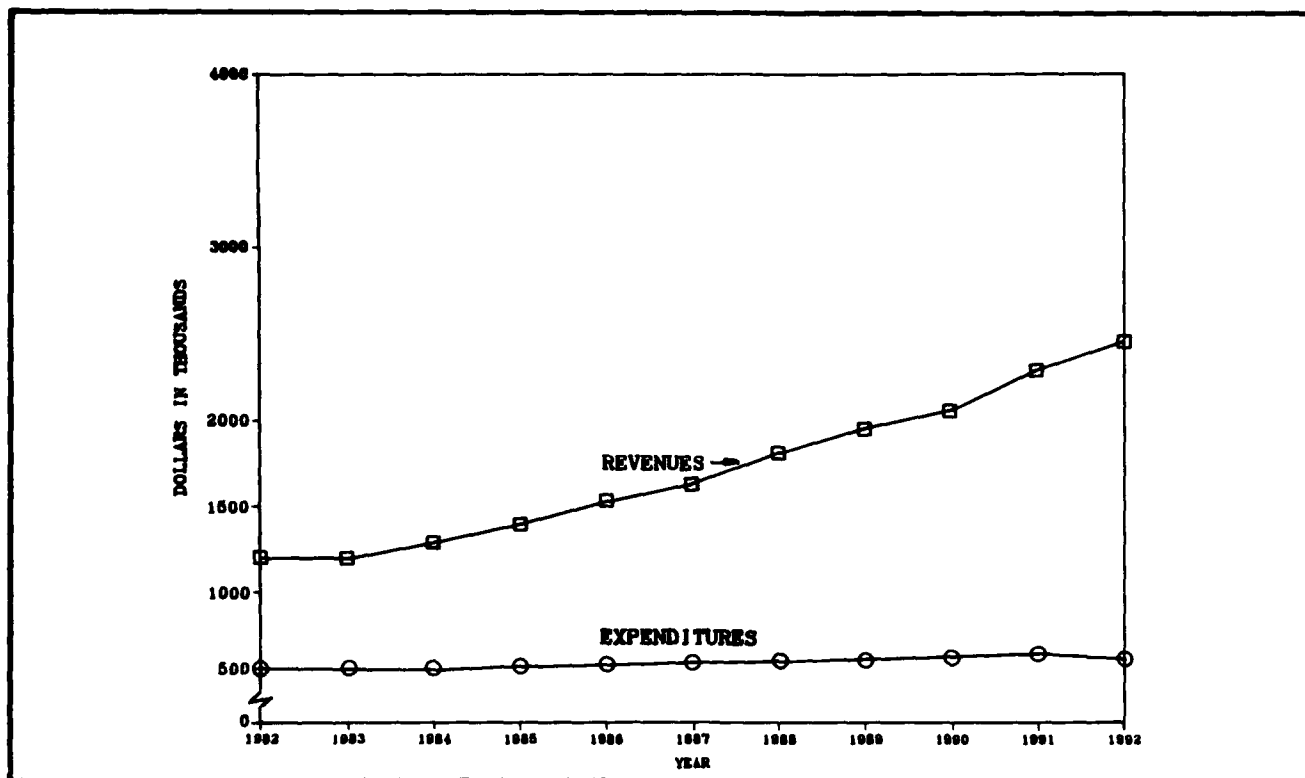
#### 3.1.3.4.6 South Cheyenne Water & Sewer District

##### 3.1.3.4.6.1 Baseline Future - No Action Alternative

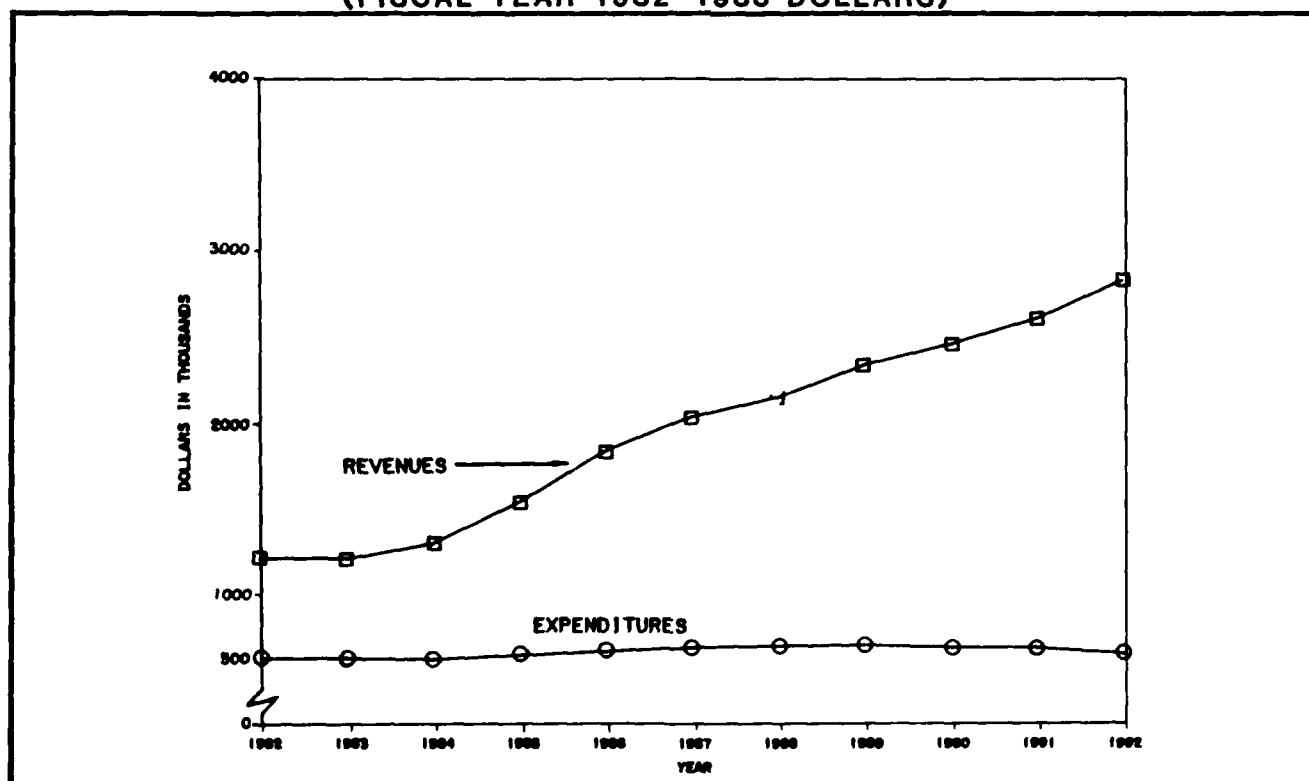
Revenue and expenditure projections are presented for the No Action Alternative in Figure 3.1.3-11. The South Cheyenne Water & Sewer District will improve its financial position as revenues would increase by 39.9 percent during the study period and expenditures would increase by only 1.7 percent. As a result, cash balances would accumulate and total revenue would double by 1992. Revenue increases will be supported by the projected increase of 1,260 persons and 432 housing units within the District and resultant tap and connection fees. When the proposed 201 Wastewater Facilities Program is implemented, the District's wastewater treatment program will be consolidated with that of the Cheyenne Board of Public Utilities, and considerable contributions to the 201 construction plan will be required. These contributions for 201 capital outlays are not currently included in this analysis.

##### 3.1.3.4.6.2 Proposed Action

Under the Proposed Action, revenues will be \$2,645,328 higher than under the No Action Alternative, primarily as a result of increases in tap and connection fees and property taxes, while expenditures are projected to increase by only \$244,160, leaving the District with significantly increased cash balances during the projection period. State and local planning officials have reported that the diversionary pipeline from the South Cheyenne wastewater plant to the Crow Creek plant, stage 1 of the 201 facilities plan, is planned to be designed in early 1984, with construction to follow immediately for an operational date of late 1987. As this process occurs, the expenditure trend of the district will tend to follow that of revenues due to required capital participation outlays. The fiscal impact in the short term is considered potentially beneficial. Revenues and expenditures for the District without the 201 Plan requirement are presented in Figures 3.1.3-11 and 3.1.3-12 for No Action and Proposed Action scenarios.



**FIGURE 3.1.3-11 REVENUE AND EXPENDITURE PROJECTIONS, SOUTH CHEYENNE WATER AND SEWER DISTRICT - NO ACTION (FISCAL YEAR 1982-1983 DOLLARS)**



**FIGURE 3.1.3-12 REVENUE AND EXPENDITURE PROJECTIONS, SOUTH CHEYENNE WATER AND SEWER DISTRICT- PROPOSED ACTION (FISCAL YEAR 1982-1983 DOLLARS)**

### 3.1.3.4.7

#### City of Cheyenne Board of Public Utilities Sewer and Waterworks Funds

##### 3.1.3.4.7.1

##### Baseline Future - No Action Alternative

Revenue and expenditure projections are presented for the No Action Alternative by Figures 3.1.3-13 and 3.1.3-14. Between 1983 and 1992, total revenues will decline by 23.3 percent while expenditures will increase by 81.0 percent, indicating an unfavorable fiscal balance. As a result of the more rapid growth of expenditures over revenues, a revenue-expenditure imbalance in the amount of \$4,905 occurs in 1985. This imbalance will increase to \$695,691 by 1986, and is expected to remain at about this amount through 1992. This unfavorable fiscal outlook is attributable to the increased expenditures associated with the operation and maintenance of the 201 regional wastewater treatment facility. The District will also contribute \$937,000 in local matching funds to the construction of the 201 wastewater treatment facility in 1985. The sewer fund will reduce its outstanding debt from \$2,860,000 to \$1,877,241. Legal debt margin will rise from \$3,312,824 to \$5,496,915 due to bond retirement and increases in assessed valuation.

The waterworks fund will also show a favorable balance as net revenues increase by 123.4 percent compared to 93.1 percent for expenditures. This occurs primarily as a result of planned rate increases. As a result, total revenue, which includes cash balances carried forward from prior years, will more than double by 1992. Most growth in revenues and expenditures will occur between 1983 and 1986 due to a phased-in rate increase of 65 percent over 1983 rates. Capital outlays include \$40,000,000 for the expansion of the District's reservoir, treatment, and distribution system. Bonded debt will be reduced from \$9,450,000 to \$1,631,524.

##### 3.1.3.4.7.2

##### Proposed Action

The waterworks fund of the Cheyenne Board of Public Utilities is projected to increase its revenues by \$1,231,477 during the projection period, while expenditures increase by only \$686,423, leaving a net gain of \$545,000 attributable to the project. These increases occur largely through increased planning and engineering fees and water tap and connection fees.

The Proposed Action will slightly improve the fiscal position of the sewer works fund although the basic revenue-expenditure imbalances predicted for the baseline will remain. The small imbalance predicted under baseline conditions for 1985 will disappear. The 1986 imbalance of \$695,691 under baseline will be reduced by just over \$25,000 under the Proposed Action. The Proposed Action will cause revenues to increase by \$359,684 over the study period while expenditures will increase by only \$200,051.

Revenues and expenditures for the Board's sewerworks and waterworks funds are presented in Figures 3.1.3-15 and 3.1.3-16 for the Proposed Action.

Impacts for the Board are considered to be negligible and not significant in the short term. Short-term potentially beneficial effects as a result of the project will result due to greater collections of planning and engineering fees as a result of increased development.

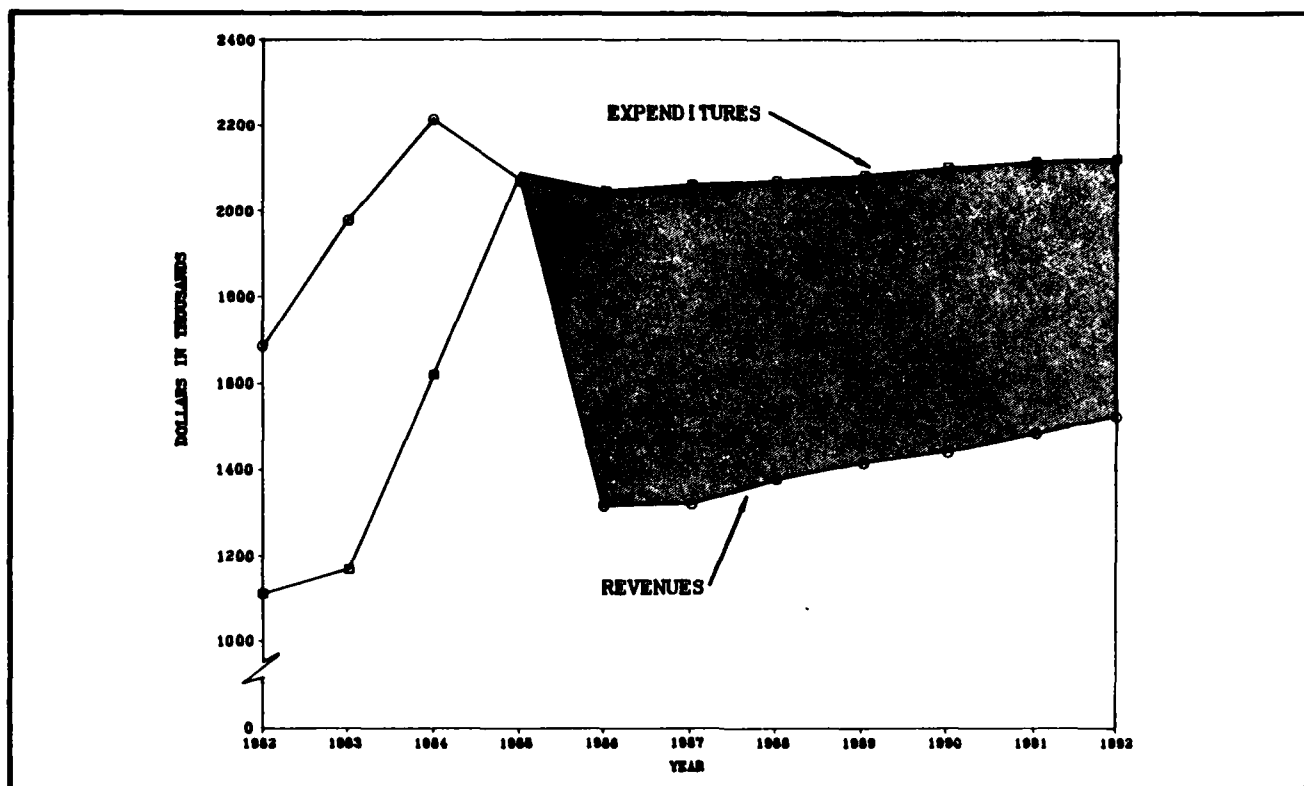


FIGURE 3.1.3-13 REVENUE AND EXPENDITURE PROJECTIONS, CHEYENNE BOARD OF PUBLIC UTILITIES, SEWERAGE - NO ACTION (FISCAL YEAR 1982-1983 DOLLARS)

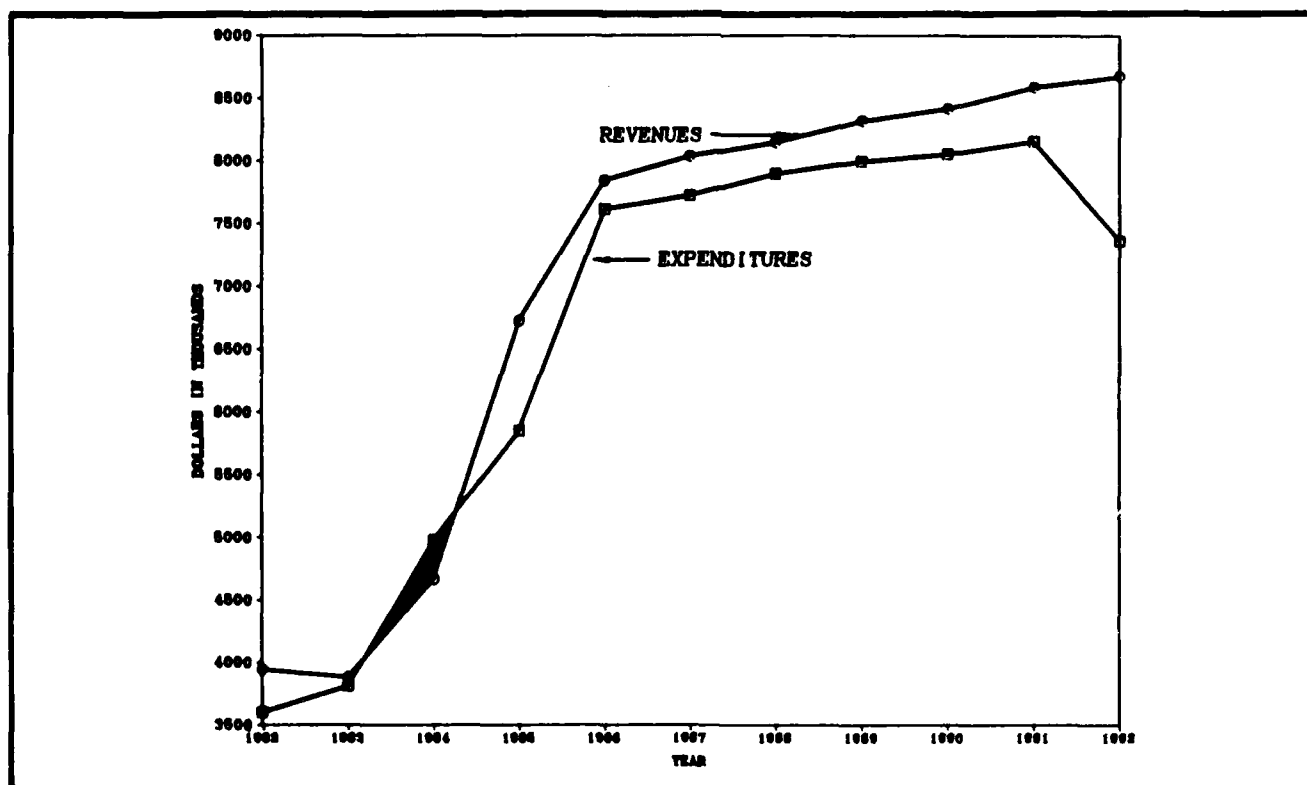


FIGURE 3.1.3-14 REVENUE AND EXPENDITURE PROJECTIONS, CHEYENNE BOARD OF PUBLIC UTILITIES, WATERWORKS - NO ACTION (FISCAL YEAR 1982-1983 DOLLARS)

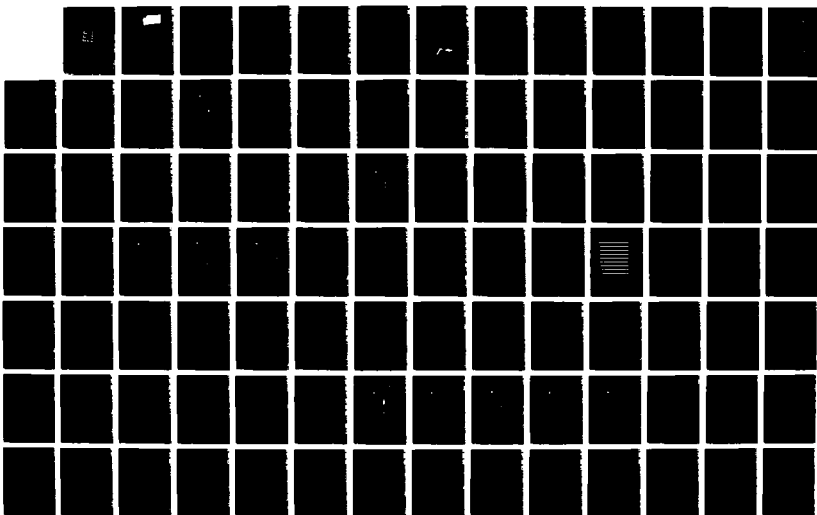
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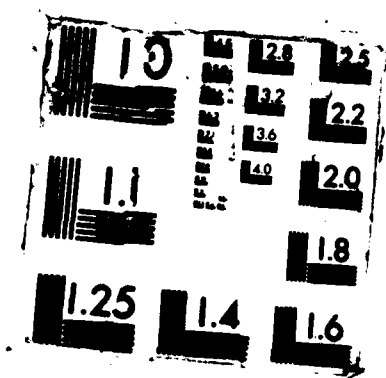
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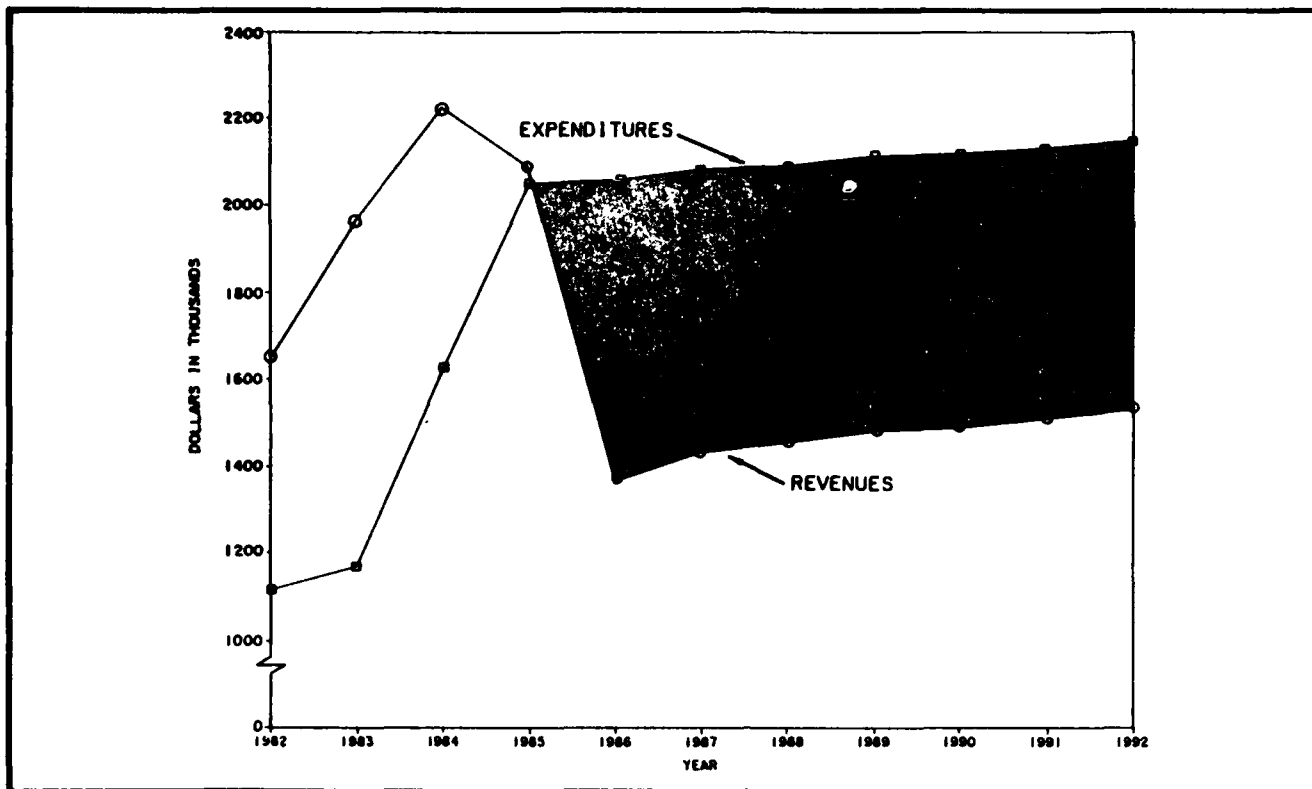
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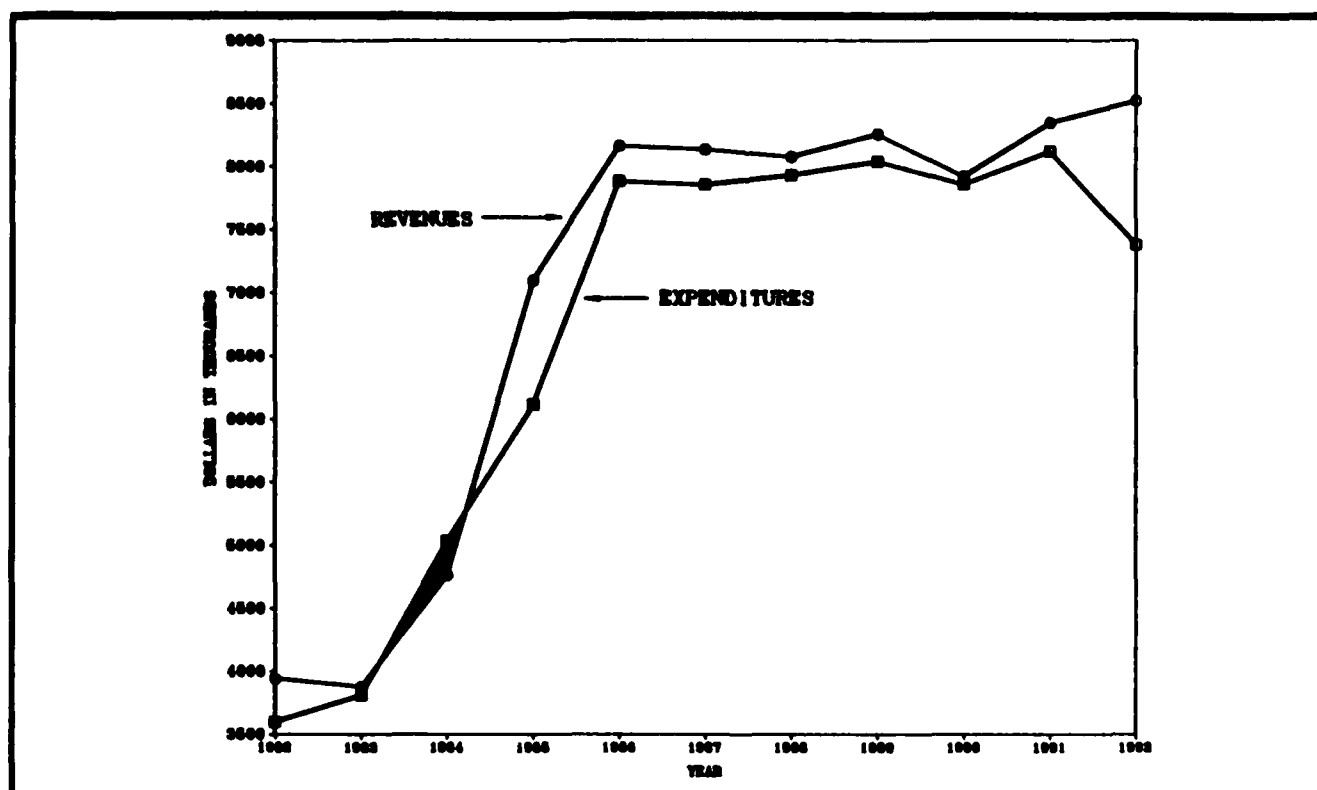
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**FIGURE 3.1.3-15 REVENUE AND EXPENDITURE PROJECTIONS, CHEYENNE BOARD OF PUBLIC UTILITIES, SEWERAGE - PROPOSED ACTION (FISCAL YEAR 1982-1983 DOLLARS)**



**FIGURE 3.1.3-16 REVENUE AND EXPENDITURE PROJECTIONS, CHEYENNE BOARD OF PUBLIC UTILITIES, WATERWORKS - PROPOSED ACTION (FISCAL YEAR 1982-1983 DOLLARS)**

### **3.1.3.4.8      Platte County**

#### **3.1.3.4.8.1      Baseline Future - No Action Alternative**

Revenue and expenditures for the No Action Alternative are presented in Figure 3.1.3-17. Total revenues will continue to exceed expenditures during the 1984 to 1992 study period despite the fact that expenditure growth of 13.8 percent will outpace net revenue growth of 6.9 percent. After 1987, expenditures will overtake revenue net of cash balance. However, accumulated cash balances will more than compensate for this imbalance, at least for the duration of the study period. The County will reduce its bonded indebtedness to zero in 1987. In that year, its legal debt margin will exceed \$2.8 million. No major capital outlays or increases in bonded indebtedness are anticipated. County assessed valuation will remain significantly lower than recent historic levels as a result of revaluation of the Missouri Basin Power Plant facility causing a loss in assessed valuation of \$44,000,000 in 1983.

#### **3.1.3.4.8.2      Proposed Action**

Under the Proposed Action, Platte County will continue to be fiscally stable, although less so than under baseline conditions. The Proposed Action will generate only \$73,622 in increased revenue over the study period, while requiring additional expenditures of \$202,351. Therefore, the County will experience a net loss of \$128,729 during the impact period. Further losses of total revenue in the amount of \$716,601 will occur because cash balances will decline by the amount that expenditures exceed revenues. Total revenue declines, including reduced cash balances and net revenue losses, will approach \$920,000.

Approximately 30 percent of the increased revenues accruing to the County under the Proposed Action will result from the county's share of the 3-percent sales and use tax. Expenditures totaling \$202,353 will occur in the amount of \$36,162 in 1985, \$81,892 in 1986 and \$84,299 in 1987. These increases will occur in all categories of expenditures. In these years, cash balances will decline beyond the amounts forecast for baseline conditions. Despite expenditure increases in excess of revenue increases for the Proposed Action, total revenue will continue to exceed expenditures in every year.

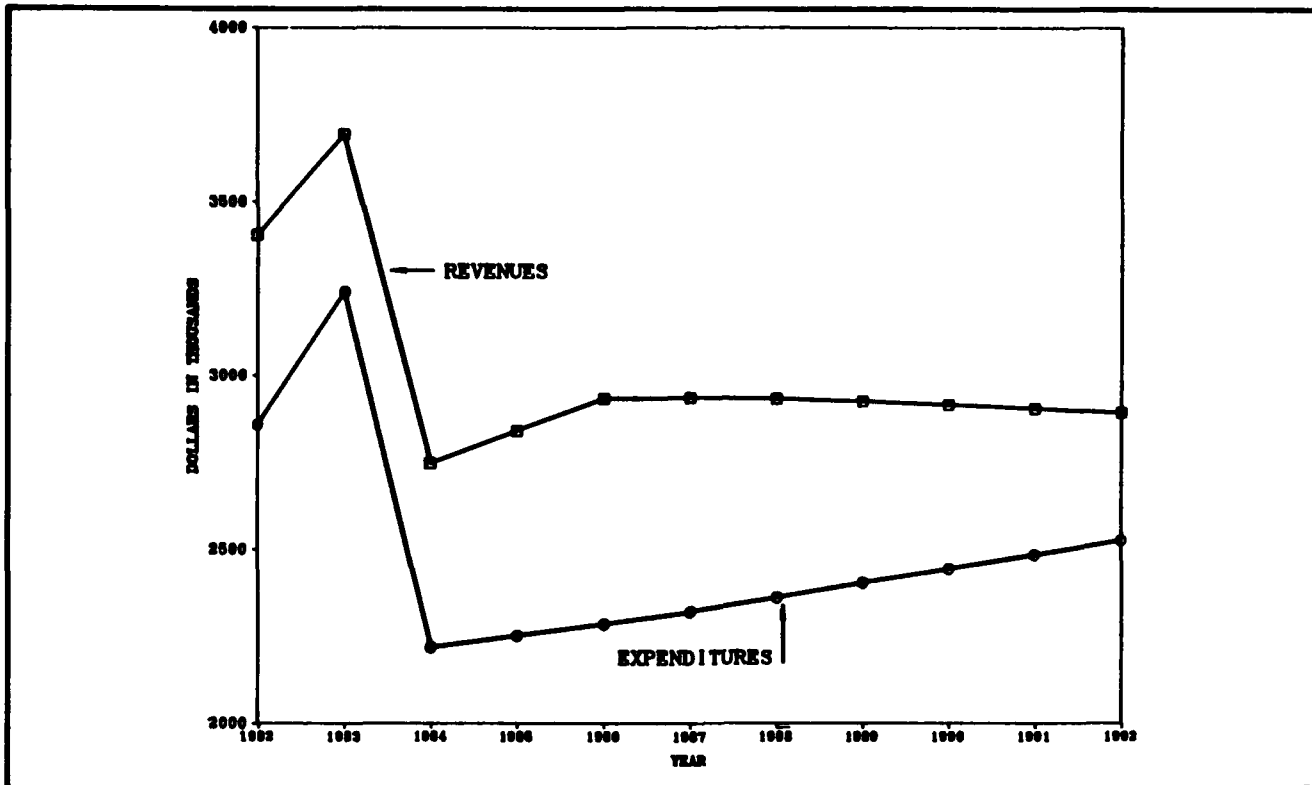
Platte County fiscal impacts are considered short term, not significant, and low because they will cause a revenue-expenditure imbalance which in turn will lower cash carryovers for a period of greater than 1 year. Long-term impacts will be negligible and not significant. Projected revenues and expenditures for Platte County under the Proposed Action are presented in Figure 3.1.3-18.

### **3.1.3.4.9      Town of Wheatland, Wyoming**

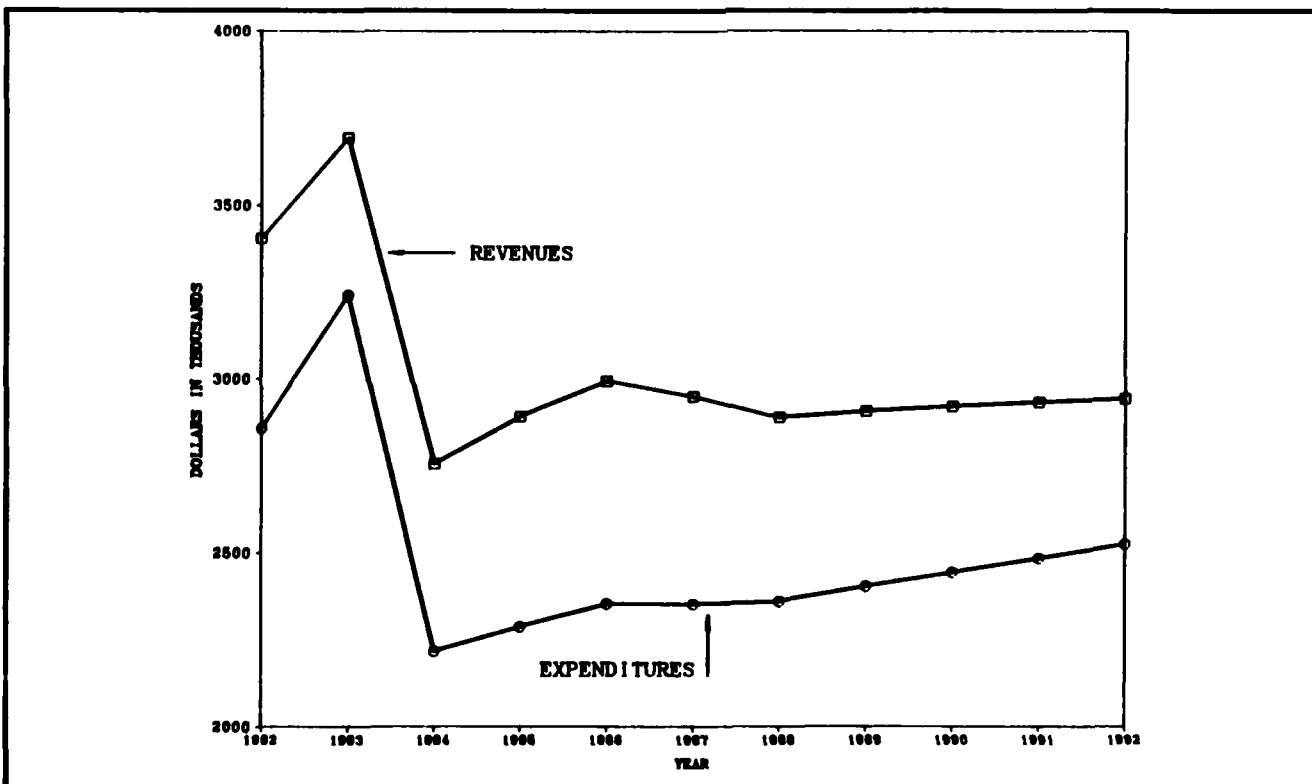
#### **3.1.3.4.9.1      Baseline Future - No Action Alternative**

Revenue and expenditure projections are presented for the No Action Alternative in Figure 3.1.3-19. Wheatland will experience fiscal stability because projected net revenue (not including cash balances and interest income) increases will outpace expenditure increases leading to the accumulation of higher cash balances. Between 1983 and 1992, revenues will rise 17.9 percent while expenditures will increase by 14.5 percent. Excess of total revenue over expenditures will rise from \$308,322 to \$3,902,523 during the same period. The 3-percent sales and use tax, severance tax and mineral royalty revenues will continue to contribute the greatest share of state-source revenues. Property taxes will remain constant since the town is not expected to substantially increase its assessed valuation as it does not reach population

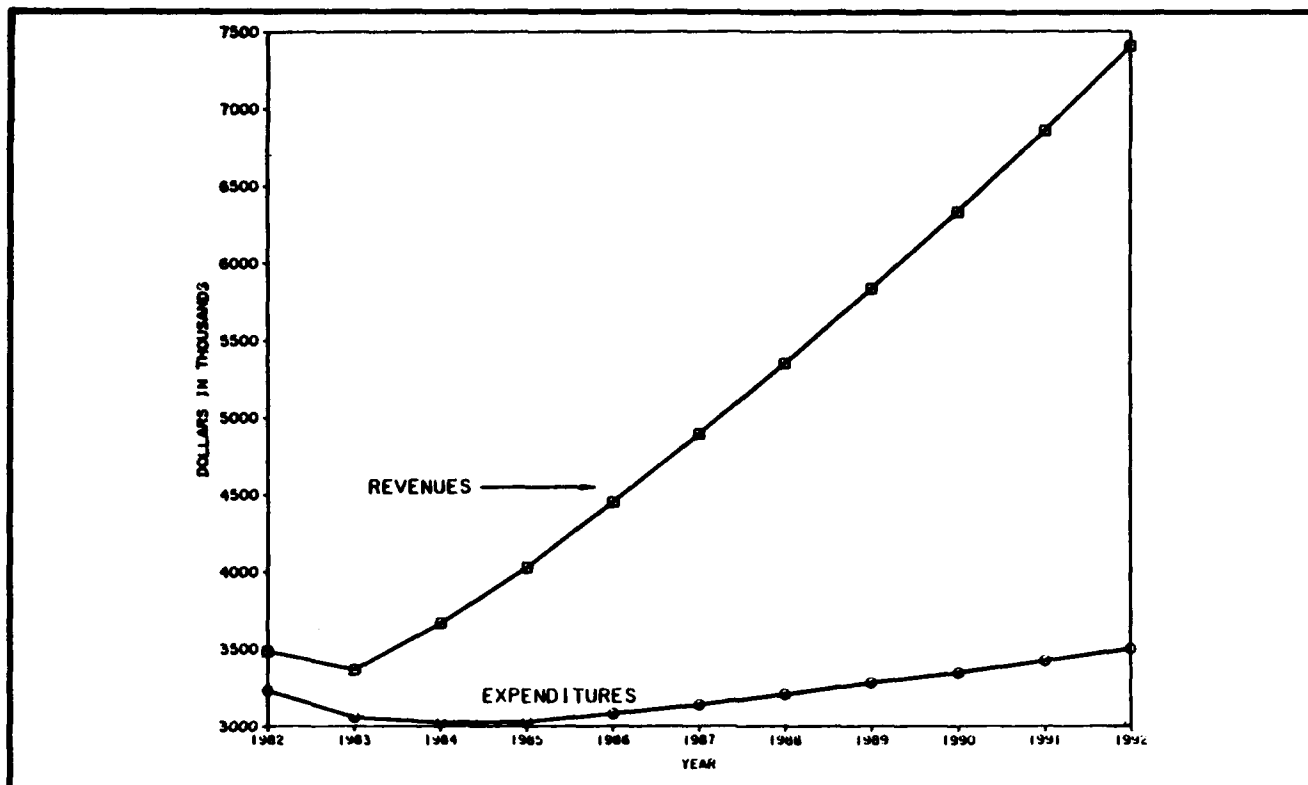




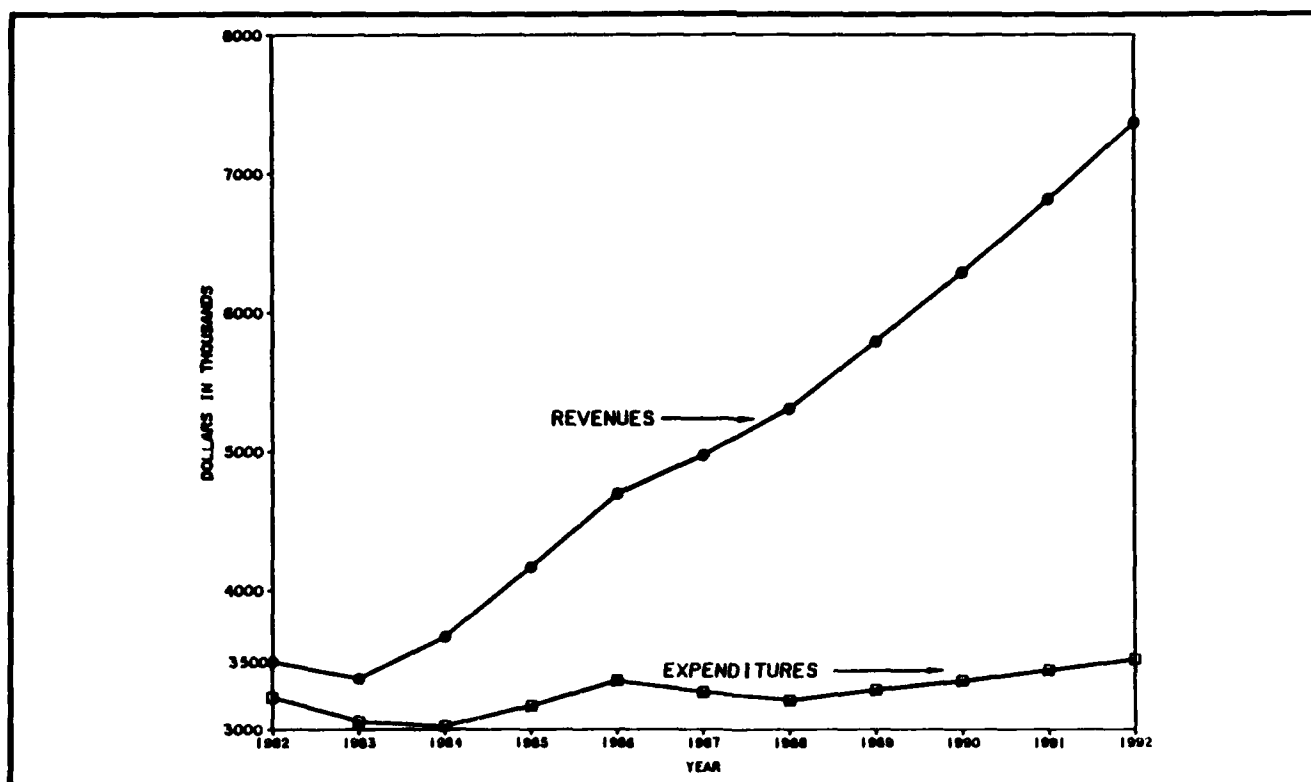
**FIGURE 3.1.3-17 REVENUE AND EXPENDITURE PROJECTIONS, PLATTE COUNTY - NO ACTION (FISCAL YEAR 1982-1983 DOLLARS)**



**FIGURE 3.1.3-18 REVENUE AND EXPENDITURES PROJECTIONS, PLATTE COUNTY - PROPOSED ACTION (FISCAL YEAR 1982-1983 DOLLARS)**



**FIGURE 3.1.3-19 REVENUE AND EXPENDITURE PROJECTIONS,  
TOWN OF WHEATLAND - NO ACTION  
(FISCAL YEAR 1982-1983 DOLLARS)**



**FIGURE 3.1.3-20 REVENUE AND EXPENDITURE PROJECTIONS,  
TOWN OF WHEATLAND - PROPOSED ACTION  
(FISCAL YEAR 1982-1983 DOLLARS)**

levels comparable to those experienced during the construction of the Missouri Basin River Plant until after 1992. Wheatland is not expected to add to 1983 bonded indebtedness of \$290,000 during the study period.

#### 3.1.3.4.9.2 Proposed Action

Despite a slight loss of net revenue (not including cash balances and interest income) caused by the Proposed Action, Wheatland will continue the stable conditions predicted under baseline. Total revenues will exceed expenditures in every year between 1983 and 1992. As a result of the Proposed Action, the city will gain an additional \$249,634 in revenue during the study period while expending an additional \$533,970. This will result in a net loss of \$284,336. The continued excess of total revenue over expenditures as a result of cash balances will prevent this slight loss from having a high impact on city finances other than causing cash balances would decline slightly from baseline values for the 1986 to 1989 period.

Fiscal impacts to the Town of Wheatland will be short term, low, and not significant because expenditure increases exceed revenue increases, thereby causing reduction in carryover funds. Long-term impacts will be negligible and not significant.

Projected revenues and expenditures for the Proposed Action are presented in Figure 3.1.3-20 (preceding page).

#### 3.1.3.4.10.1 Baseline Future - No Action Alternative

Under No Action conditions, the Town of Chugwater is not expected to experience any major changes in its fiscal conditions. Annual collections from the 3-percent sales and use tax are projected to increase by approximately \$1,000 to \$2,000 annually during the study period. By 1989, population will increase to the level reported in the 1980 Census. Since the Town does not publish a budget, no detailed analysis of revenues and expenditures is presented in this report.

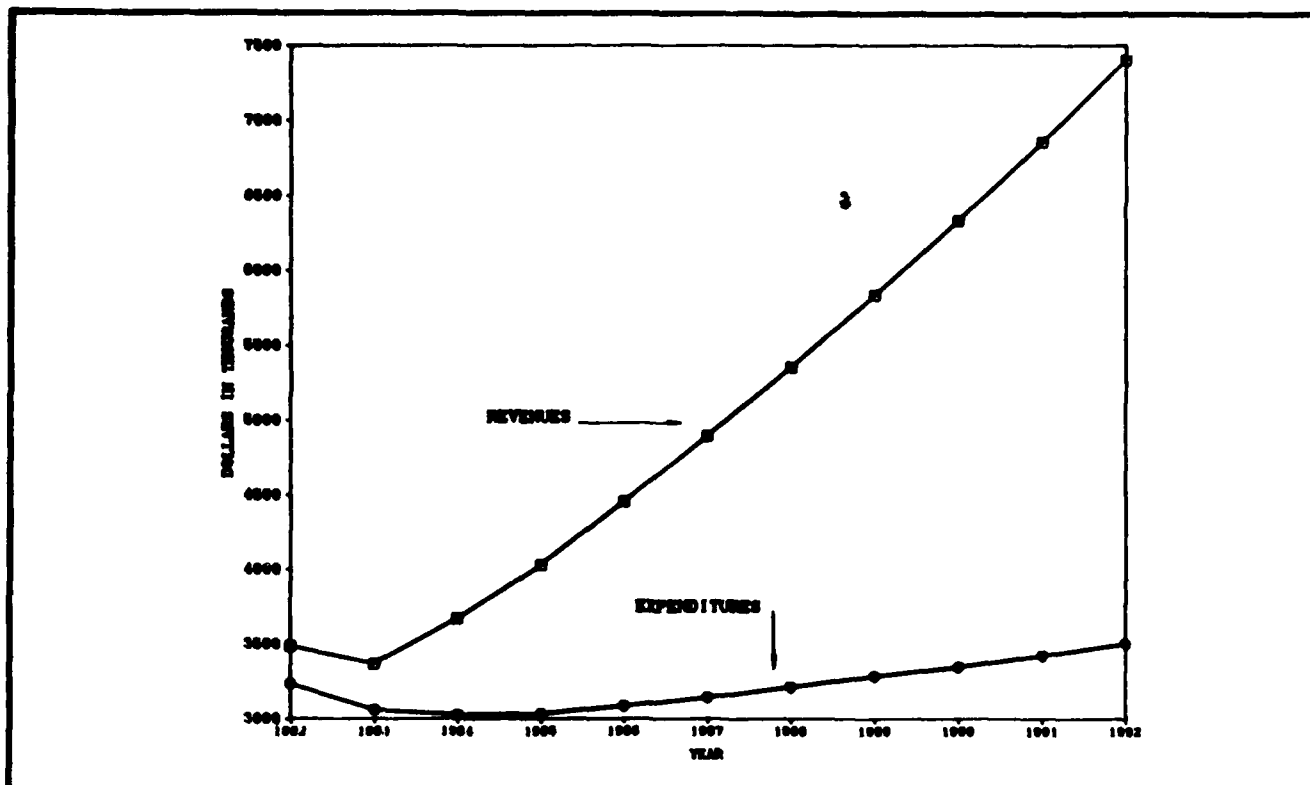
#### 3.1.3.4.10.2 Proposed Action

Chugwater is expected to experience an increase in population between the years 1985 and 1987. Expenditures to provide even minimal services to these persons will be substantial compared to the reported \$70,000 budget the Town currently maintains. The only substantial increase in revenues will be as a result of the town's share of the 3-percent sales and use tax which will generate an additional \$4,000 during the study period over the No Action projection. Because of the uncertainty involved and the relative magnitude of the projected population increase, the Town of Chugwater is expected to experience moderate and significant, short-term impacts as a result of the Proposed Action. Increased expenditures are expected to exceed increased revenues for a period of greater than 1 year. Long-term fiscal impacts will be negligible and not significant.

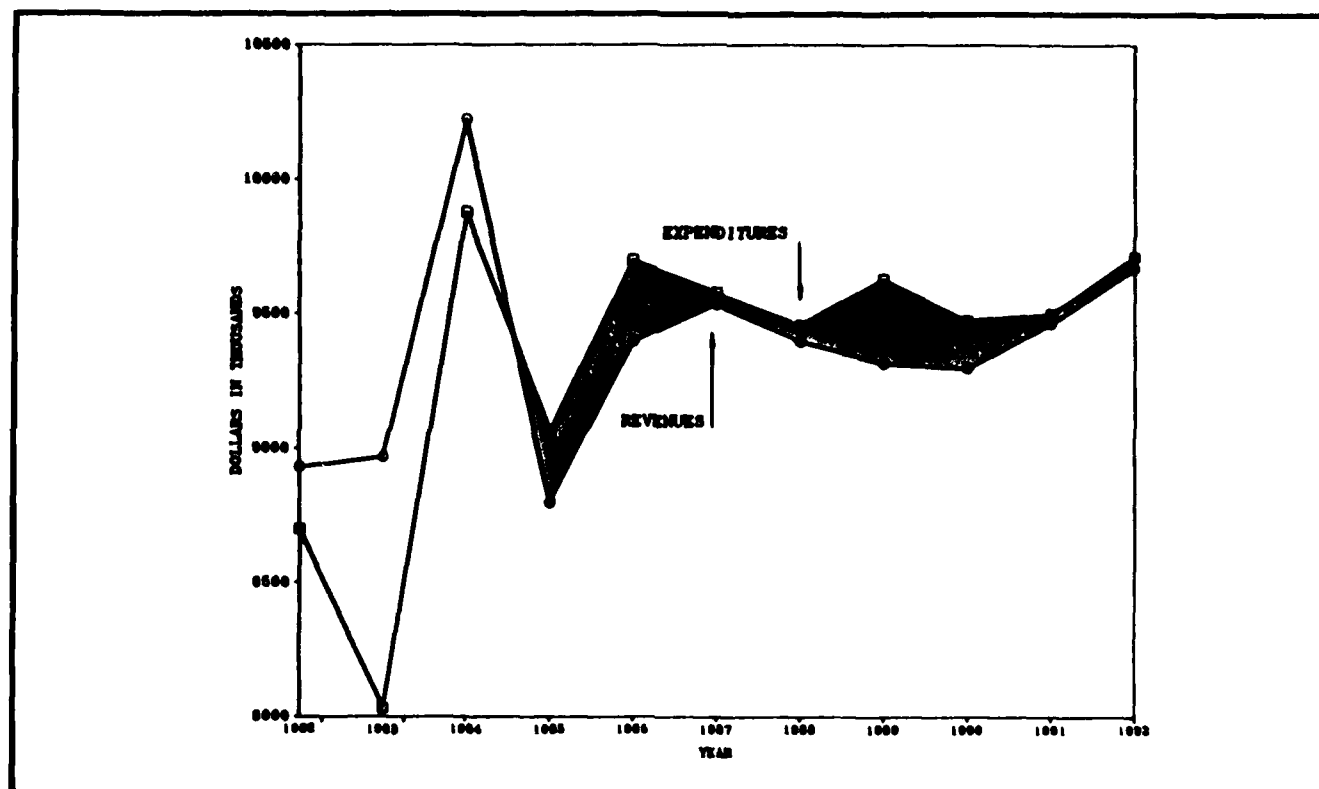
#### 3.1.3.4.11 Platte County School District No. 1

##### 3.1.3.4.11.1 Baseline Future - No Action Alternative

Revenue and expenditure projections are presented for the No Action Alternative in Figure 3.1.3-21. Platte County School District No. 1 will experience tight fiscal conditions because expenditure growth of 20.8 percent will greatly exceed revenue growth of 7.4 percent. This trend will result in a revenue-expenditure imbalance by 1986 which will increase by \$342,126 by 1989. Revenues will fluctuate early in the study period due to the enrollment changes, variations in the number of state recognized classroom units, and



**FIGURE 3.1.3-21 REVENUE AND EXPENDITURE PROJECTIONS, PLATTE COUNTY SCHOOL DISTRICT NO. 1 - NO ACTION (FISCAL YEAR 1982-1983 DOLLARS)**



**FIGURE 3.1.3-22 REVENUE EXPENDITURE PROJECTIONS, PLATTE COUNTY SCHOOL DISTRICT NO. 1 - PROPOSED ACTION (FISCAL YEAR 1982-1983 DOLLARS)**

changes in the entitlement formula used by the State Foundation Program. The County 12 mill levy for property taxes will drop to 6 mills in 1984, causing further losses of revenue. The future status of the State Foundation Program emerges as a critical fiscal issue for the District. If the Wyoming State Legislature enacts one of the eight currently pending proposals aimed at increasing the contributions of the State Foundation Program, the District's financial difficulties could be eased.

Capital expenditures will peak in 1984 when the District will spend a total of \$644,000 on repairs and maintenance, school buses, and an athletic track and field. The District will not add to its 1982 bonded debt of \$965,671. By 1991, the District will complete retirement of nonspecial levy fund bonded debt.

#### 3.1.3.4.11.2 Proposed Action

The Proposed Action is expected to have a beneficial effect on the fiscal stability of Platte County School District No. 1. However, these benefits will not be sufficient to alter the revenue-expenditure imbalance predicted under baseline conditions. The school district is expected to gain \$1,165,364 in revenue while expending a total of \$1,020,403 during the study period, for a net gain of \$144,962. The revenue-expenditure imbalance predicted for 1986 under baseline will occur under the Proposed Action, but by a margin of \$5,000 less. Imbalances in subsequent years will be reduced slightly as well.

Like other Wyoming school districts, more than 85 percent of increased state-source revenues will come from the State Foundation Program. Program revenues will grow by \$858,706 because of increasing classroom units and enrollment. State sources will contribute approximately 80 percent of additional total revenue under the Proposed Action.

Increased expenditures will be limited to the instructional services and administrative categories. Capital outlays and debt service expenditures will remain uncharged.

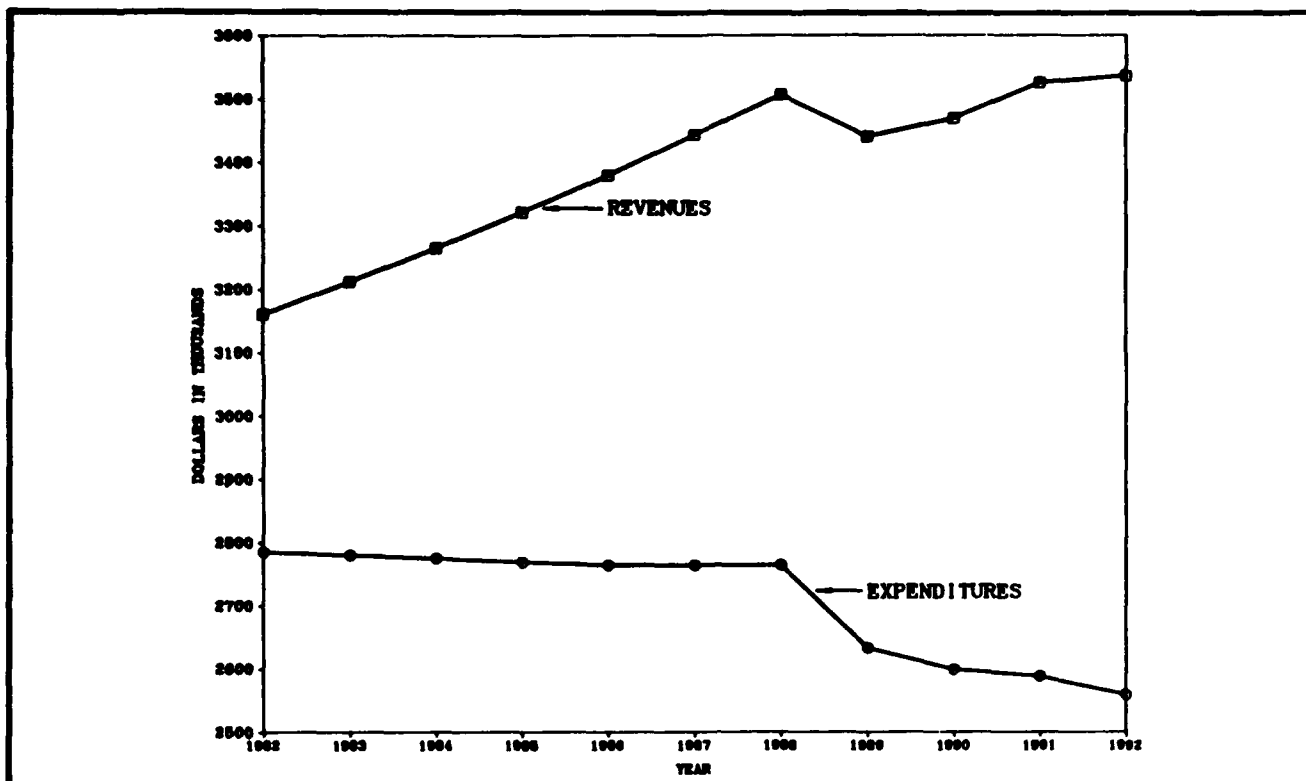
Fiscal impacts on Platte County School District No. 1 will be negligible and not significant in both the short and long term because expenditure increases are offset by greater increases in revenues.

Projected revenues and expenditures for the Proposed Action are presented in Figure 3.1.3-22 (preceding page).

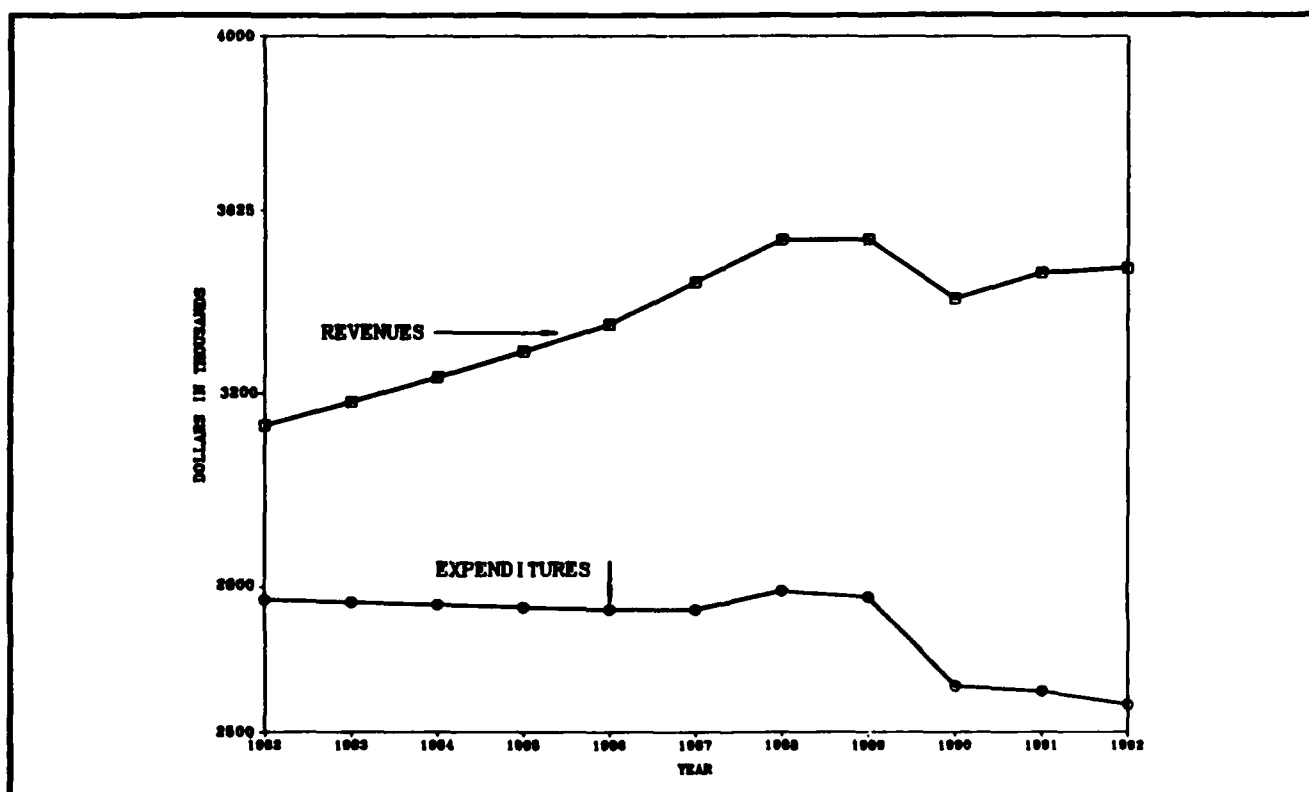
#### 3.1.3.4.12 Kimball County

##### 3.1.3.4.12.1 Baseline Future - No Action

Revenue and expenditure projections are presented for the No Action Alternative in Figure 3.1.3-23. Kimball County is expected to maintain its fiscal stability despite the decline of both revenues and expenditures. Between 1983 and 1992, net revenues and expenditures will decline 8.2 and 7.9 percent, respectively. Net revenues will continue to exceed expenditures by \$45,000 to \$50,000 despite their decline. As a result, cash balances will begin to accumulate, causing total revenue to rise by 10.1 percent. Between 1983 and 1992, the County will reduce its outstanding bonded debt from \$1,175,000 to \$86,976. No major capital outlays are anticipated.



**FIGURE 3.1.3-23 REVENUE AND EXPENDITURE PROJECTIONS, KIMBALL COUNTY - NO ACTION (FISCAL YEAR 1982-1983 DOLLARS)**



**FIGURE 3.1.3-24 REVENUE AND EXPENDITURE PROJECTIONS, KIMBALL COUNTY - PROPOSED ACTION (FISCAL YEAR 1982-1983 DOLLARS)**

#### 3.1.3.4.12.2 Proposed Action

Revenue and expenditures for the Proposed Action are presented for Kimball County in Figure 3.1.3-24 (preceding page). As indicated by the figure, the Proposed Action is expected to cause the additional expenditure of \$197,634 while gaining the County only \$96,564 in revenue. As a result, the county will suffer a net loss of \$101,070 over the life of the project. Because total revenues will continue to exceed expenditures by substantial margins, the net loss referred to above will not adversely affect the County's fiscal stability. Cash balances will be reduced by \$15,000 to \$35,000 between 1990 and 1991. About 15 percent of total additional impact-related revenue will accrue from state sources. The balance will accrue from various local sources. The largest local sources of revenue will continue to be hospital user fees and the general fund ambulance-road and bridge levy. Expenditure increases will occur in all noncapital categories. Capital spending will remain unchanged.

Fiscal impacts on Kimball County associated with the Proposed Action are anticipated to be low and not significant in the short term because increased operating expenditures will not be fully offset by increased revenues causing a decline in carryover funds. Impacts will affect more than a single budgetary year. Long-term impacts will be negligible and not significant.

#### 3.1.3.4.13 City of Kimball

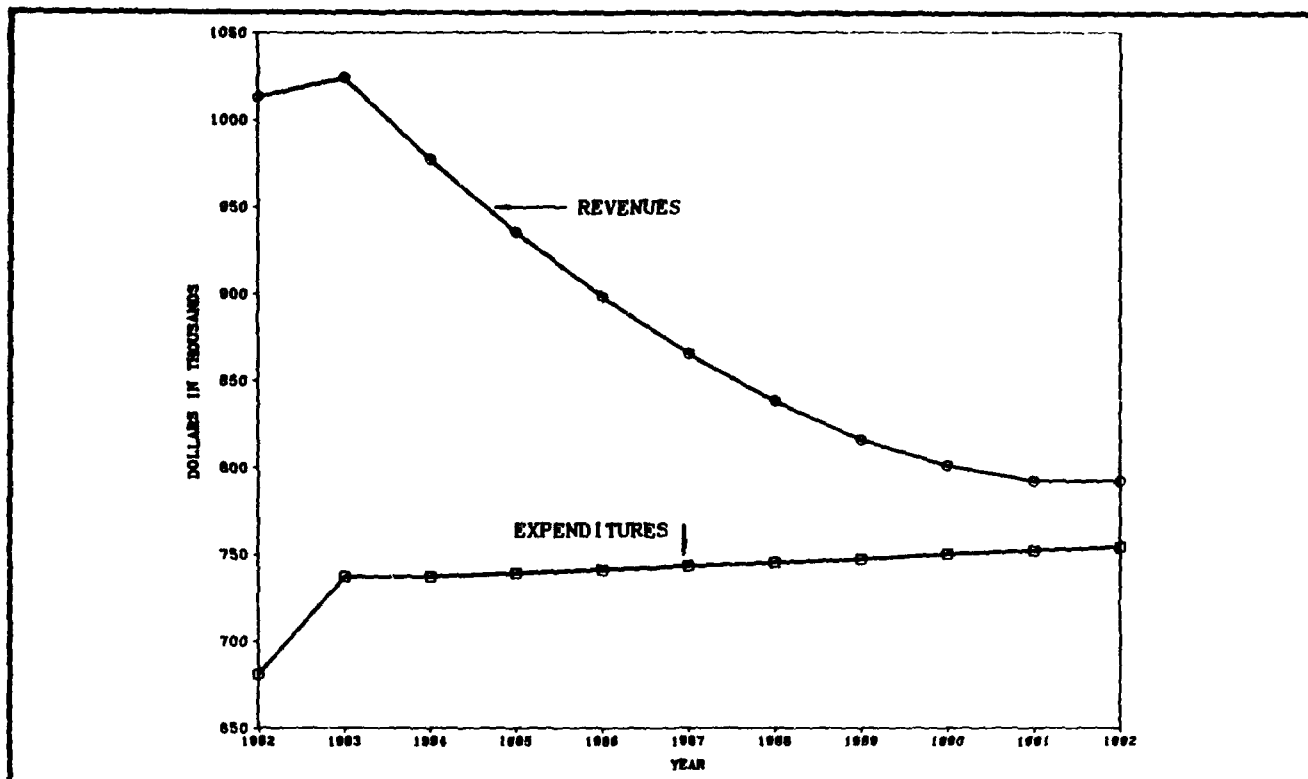
##### 3.1.3.4.13.1 Baseline Future - No Action Alternative

Despite the projected excess of expenditures over revenues, net of interest and cash balances, Kimball City will experience fiscal stability due to substantial cash balances accumulated early in the study period. Revenues and expenditures are depicted in Figure 3.1.3-25. In addition, the rate of net revenue growth will exceed that of expenditures, thereby narrowing the margin by which expenditures exceed net revenue in 1992. Between 1983 and 1992 net revenues - defined as total revenue less cash balance and interest - will increase by \$70,380 from \$641,796 to \$712,176, an increase of 10.9 percent. At the same time, expenditures will increase only by \$16,715 from \$737,466 to \$754,181, an increase of 2.2 percent. The continuing gap between net revenue and expenditures will cause cash balances and therefore total revenue to decline 22.6 percent during the study period. However, total revenues will continue to exceed expenditures in every year.

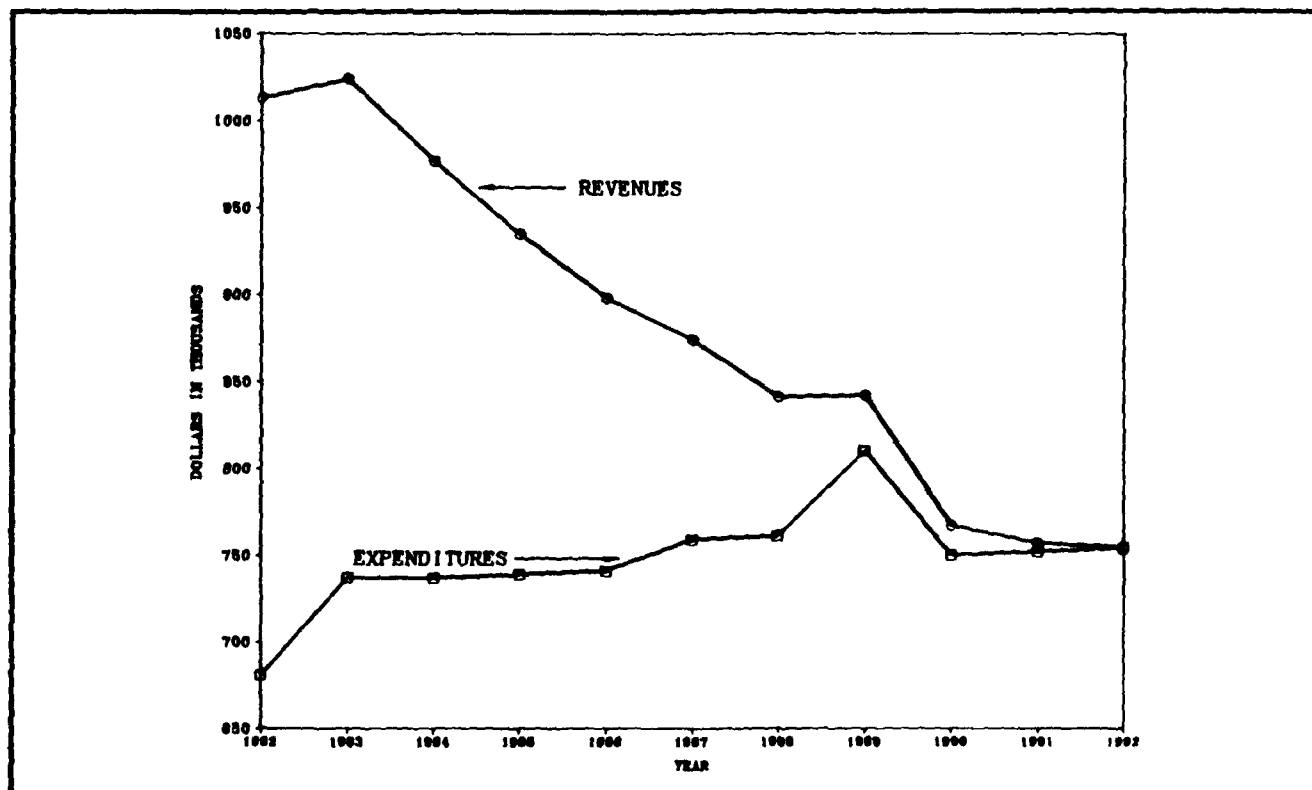
##### 3.1.3.4.13.2 Proposed Action

Revenue and expenditure projections for the Proposed Action are presented in Figure 3.1.3-26 for the City of Kimball. The data indicate that the City will receive an additional \$60,328 in net revenue over the projection period as a result of the Proposed Action. At the same time, the City will face additional expenditures of \$94,018 due to population increases. The excess of additional expenditures over revenues will cause cash balances to decline by \$123,899. As a result, total revenues will decline by \$66,819 over the projection period. The margin by which total revenues exceed expenditures will also decline to only \$5,607 and \$926 for 1991 and 1992, respectively. Comparable baseline amounts for those years were \$37,865 and \$40,719. Over 80 percent of the total revenue increase will be attributable to state sources. Local revenues will increase by only \$11,075 over the study period. Capital expenditures and debt service will register no change.

Short-term fiscal impacts on the City of Kimball will be low and not significant because revenue increases will be exceeded by expenditure increases resulting in cash balance reductions. Impacts will influence the budget for a period of greater than 1 year. Long-term impacts will be negligible and not significant.



**FIGURE 3.1.3-25 REVENUE AND EXPENDITURE PROJECTIONS, KIMBALL CITY - NO ACTION  
(FISCAL YEAR 1982-1983 DOLLARS)**



**FIGURE 3.1.3-26 REVENUE AND EXPENDITURE PROJECTIONS, KIMBALL CITY - PROPOSED ACTION  
(FISCAL YEAR 1982-1983 DOLLARS)**



### **3.1.3.4.14      City of Kimball Combined Utilities Fund**

#### **3.1.3.4.14.1      Baseline Future - No Action Alternative**

Revenues and expenditure projections are presented for the No Action Alternative in Figure 3.1.3-27. The period 1983 to 1992 will be characterized by tight fiscal conditions because the expenditure growth rate of 9.4 percent will greatly outpace revenue growth of 2.3 percent. This condition will result in revenue-expenditure imbalance during 1990. Due to a reduction in debt service payments in 1991, this imbalance will be resolved in 1991 to 1992. No increases in bonded indebtedness are anticipated.

#### **3.1.3.4.14.2      Proposed Action**

The Proposed Action will ease to a slight degree the tight fiscal conditions predicted for the baseline. Revenues associated with the Proposed Action are projected to total \$228,078 while expenditures will reach only \$152,606. As a result, the Utilities Fund will experience a beneficial net cash gain of \$75,472. The slight excess of revenues over expenditures will allow the District to trim the imbalance forecast under baseline conditions for 1990 by several thousand dollars. As was the case under baseline, the district will return to a positive balance in 1991 as a result of debt retirement. Increased revenues will result mostly from sales of electric, water and sewer services to immigrants who move to Kimball as a result of the project actions. Higher expenditures reflect the higher cost of serving these additional people. No additional capital outlays or debt service payments are expected as a result of the proposed project. Revenues and expenditures for the Proposed Action are presented in Figure 3.1.3-28. Fiscal impacts are considered potentially beneficial in the short term since revenues as a result of the Proposed Action exceed projected expenditures.

### **3.1.3.4.15      Kimball County High School District No. 1**

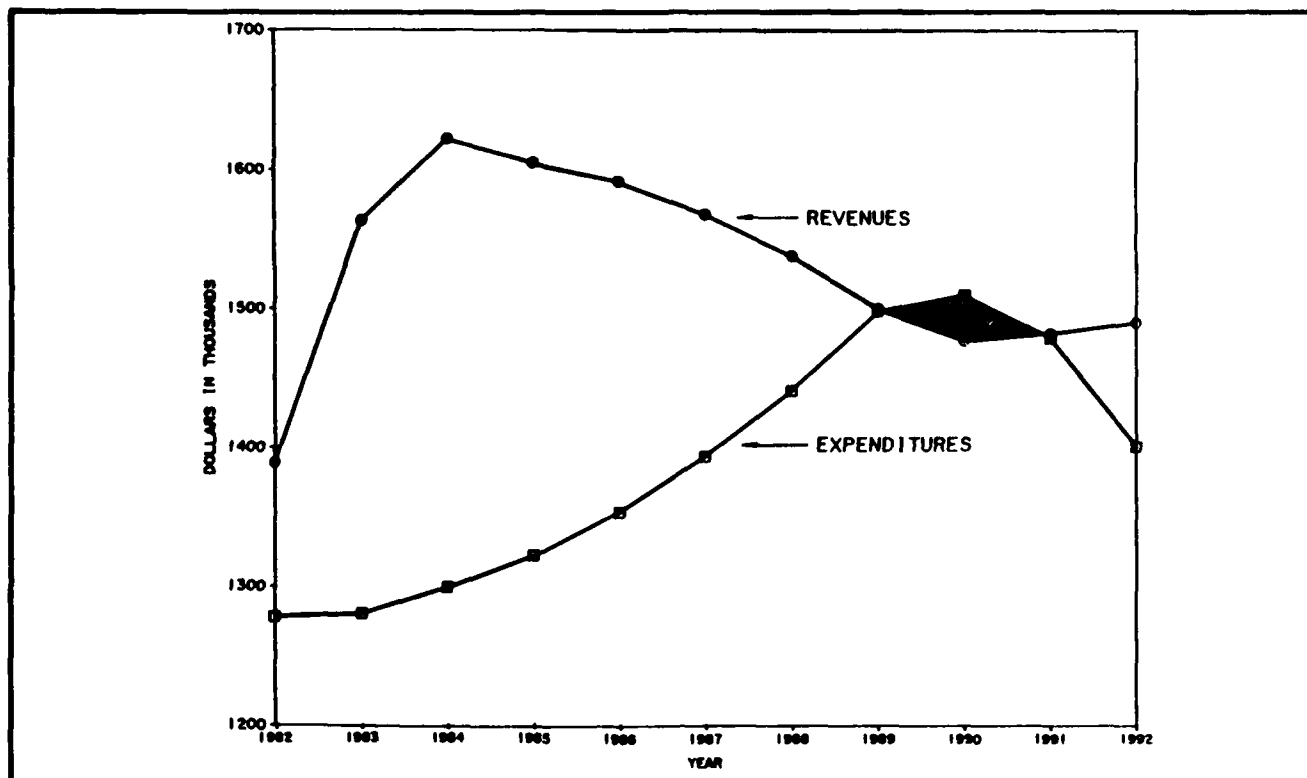
#### **3.1.3.4.15.1      Baseline Future - No Action Alternative**

Revenue and expenditure projections are presented for the No Action Alternative in Figure 3.1.3-29. Stable total revenues and declining expenditures will allow the County to maintain fiscal stability between 1983 and 1992. The consistent excess of net revenues over expenditures will cause cash balances to reach \$1,669,636 by 1992. The availability of financial resources could allow the District to expand services, increase capital outlays, or alternatively, decrease the mill levy for property taxes. Increases in bond indebtedness are not presently anticipated.

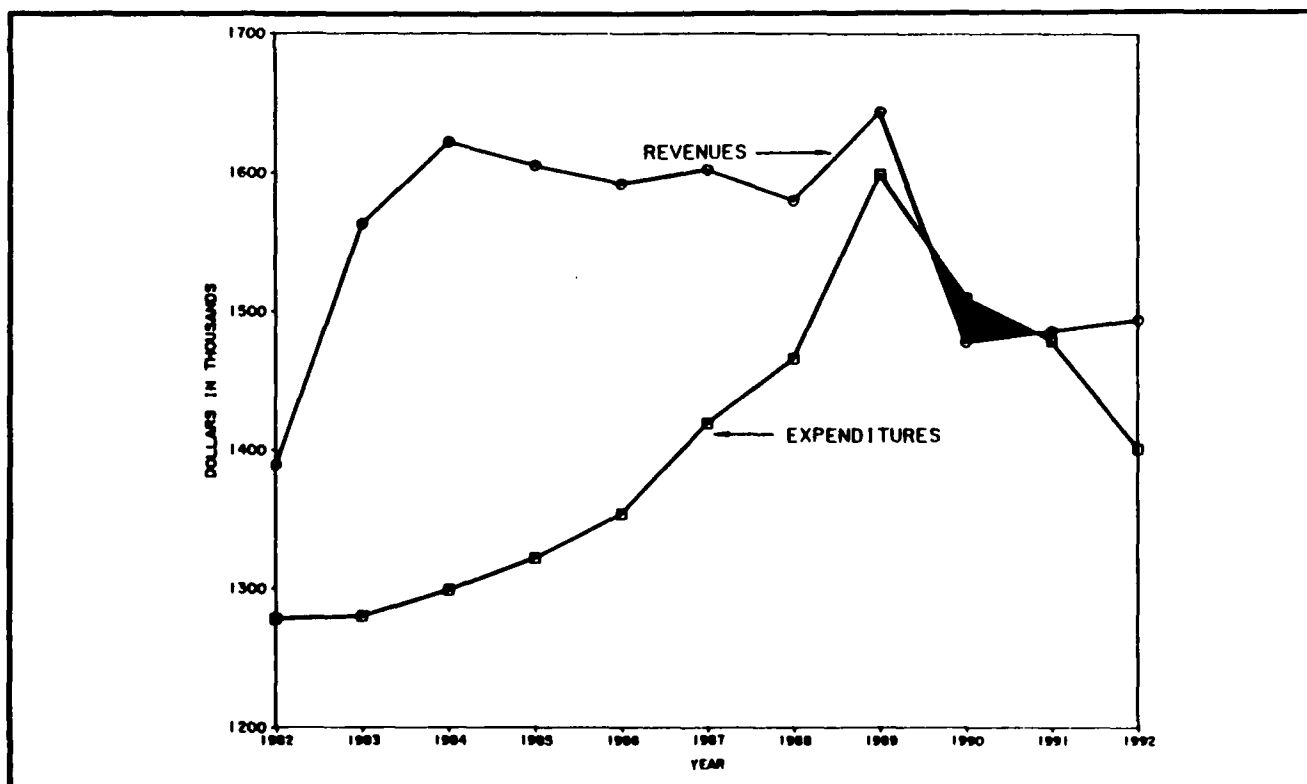
#### **3.1.3.4.15.2      Proposed Action**

As indicated by Figure 3.1.3-30, the Proposed Action will further improve the fiscal stability of Kimball County School District No. 1. Impact-related revenue increases are expected to total \$119,476 over the study period while expenditure increases will total \$102,021. As a result, the District will experience a beneficial net gain of \$17,455. This gain will add to the amount by which revenues were forecast to exceed expenditures under baseline conditions. As a result, the District will experience high cash balances for the 1989 to 1992 period and higher total revenue for the 1988 to 1992 period.

Fiscal impacts on Kimball County School District No. 1 will be potentially beneficial in the short term because revenues increases will exceed expenditure increases.



**FIGURE 3.1.3-27 REVENUE AND EXPENDITURE PROJECTIONS, CITY OF KIMBALL COMBINED UTILITIES FUND - NO ACTION (FISCAL YEAR 1982-1983 DOLLARS)**



**FIGURE 3.1.3-28 REVENUE AND EXPENDITURE PROJECTIONS, CITY OF KIMBALL COMBINED UTILITIES FUND - PROPOSED ACTION (FISCAL YEAR 1982-1983 DOLLARS)**

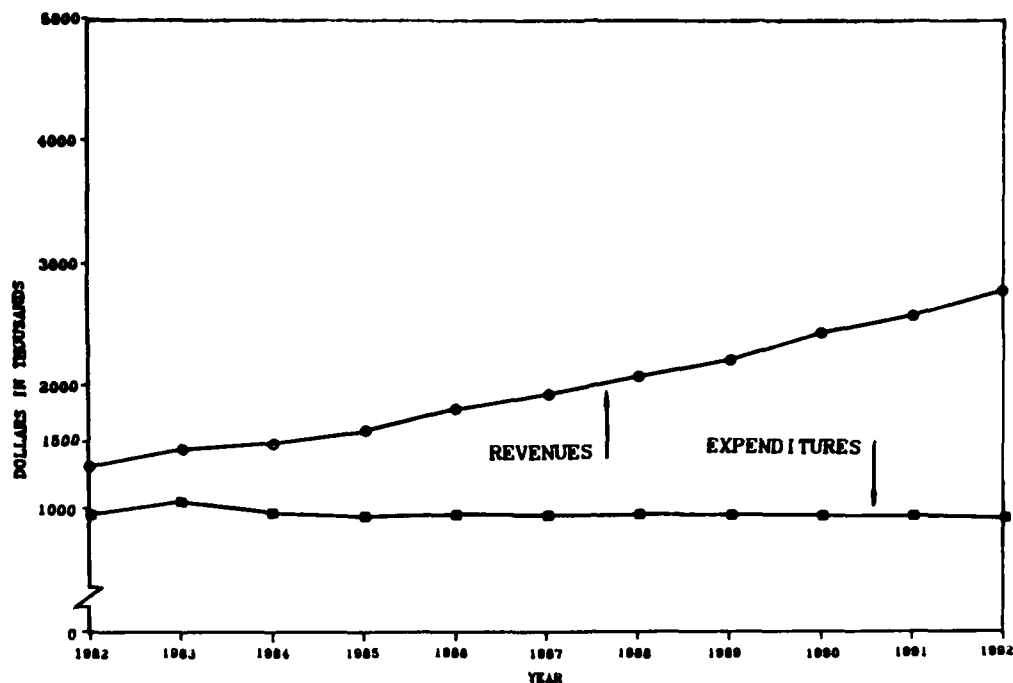


FIGURE 3.1.3-29 REVENUE AND EXPENDITURE PROJECTIONS, KIMBALL COUNTY HIGH SCHOOL DISTRICT NO. 1 - NO ACTION (FISCAL YEAR 1982-1983 DOLLARS)

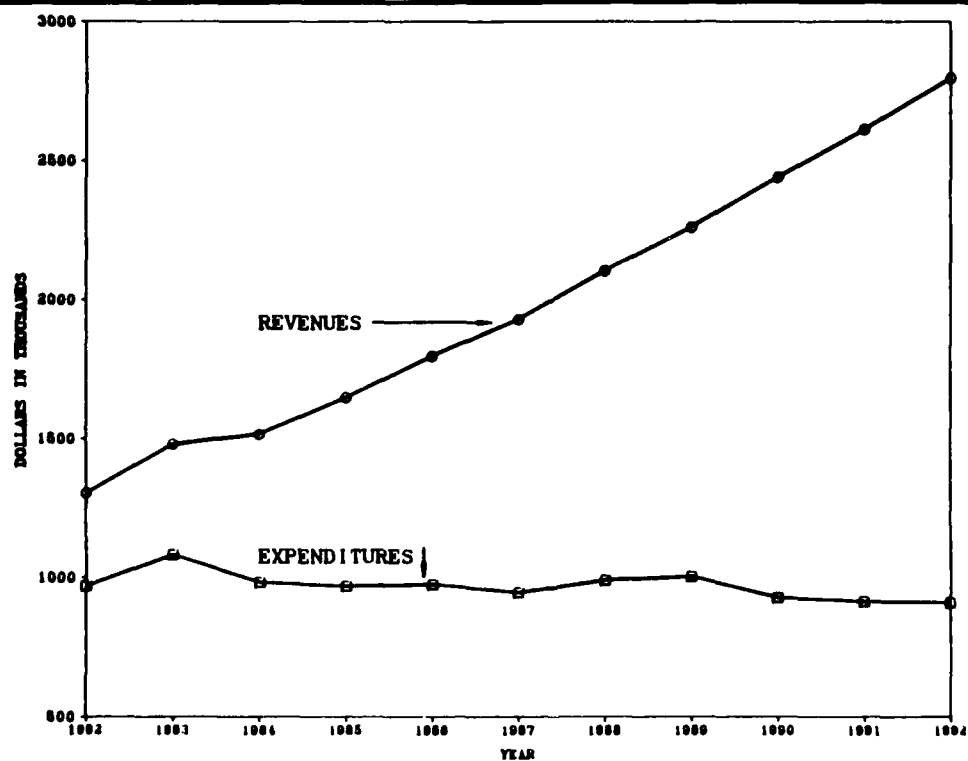


FIGURE 3.1.3-30 REVENUE AND EXPENDITURE PROJECTIONS, KIMBALL COUNTY HIGH SCHOOL DISTRICT NO. 1 - PROPOSED ACTION (FISCAL YEAR 1982-1983 DOLLARS)

### **3.1.3.4.16      Kimball County Elementary School District No. 3**

#### **3.1.3.4.16.1      Baseline Future - No Action Alternative**

Revenue and expenditure projections are presented for the No Action Alternative in Figure 3.1.3-31. The twofold increase in revenues projected to take place between 1983 and 1992 will place District No. 3 on sound financial footing. The \$3.3 million excess in revenue over expenditure could allow the District to expand services, increase capital outlays, or alternatively, decrease the mill levy for property taxes. No major capital outlays or increases in bonded indebtedness are anticipated.

#### **3.1.3.4.16.2      Proposed Action**

As a result of the Proposed Action, Kimball County School District No. 3 will experience a net loss of \$19,687. However, this slight loss will not be significant because total revenues will continue to exceed expenditures by margins of greater than two to one. Revenue increases will total \$168,910 while expenditure increases will total \$188,597, creating the net loss of \$19,687 referred to above. Most of the increased revenue will occur from state sources. Increased expenditures will occur in 1988 to 1989 as a result of higher enrollments associated with the Proposed Action.

Fiscal impacts on the School District will be low, not significant in the short term because expenditure increases will exceed revenue increases for a period of greater than 1 year. Long-term impacts will be negligible and not significant. Revenue and expenditure projections for the Proposed Action are presented in Figure 3.1.3-32.

### **3.1.3.4.17      Consideration of Alternatives**

As no changes in population impacts are anticipated to result from location of dispatch station alternatives or cable routing alternatives, no variation in public finance impacts are projected. For the road alternatives, increased operations and maintenance costs and revenues are considered in the analysis.

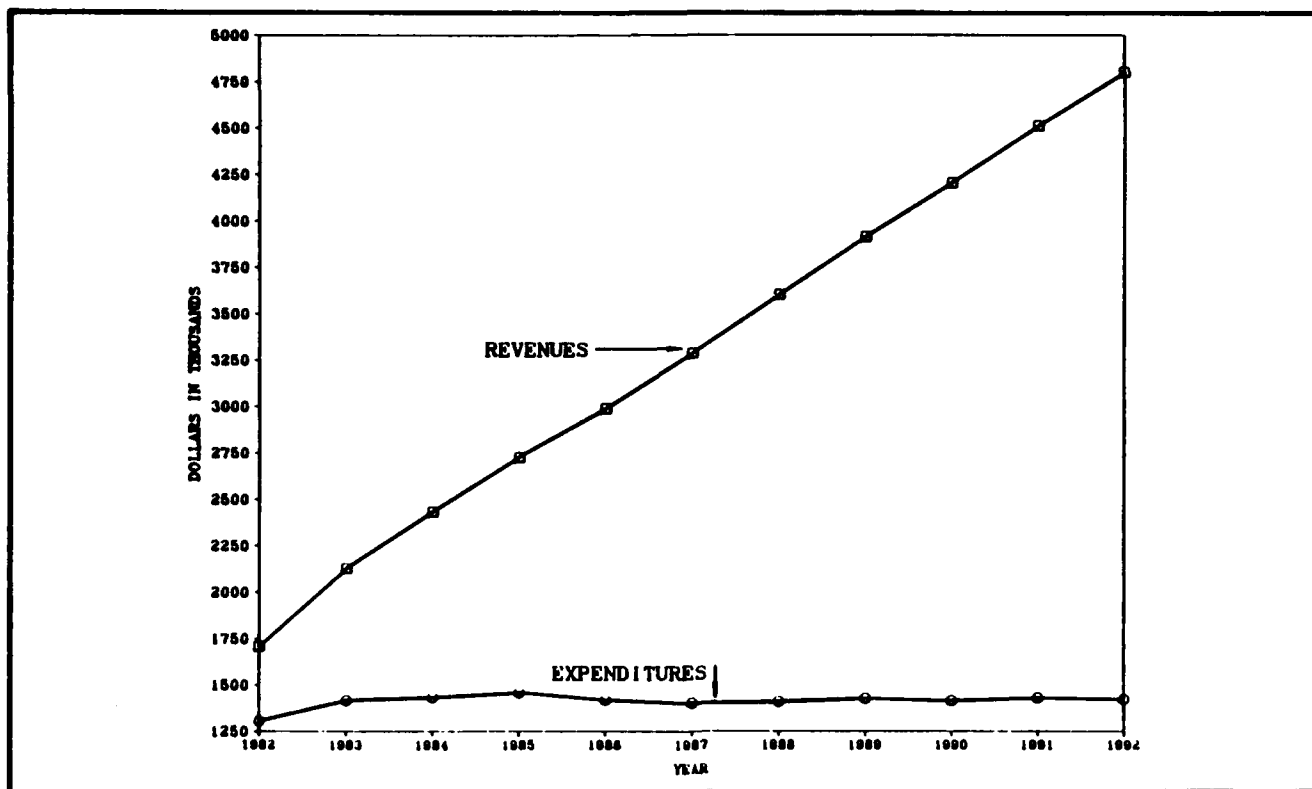
### **3.1.3.5      Summary of Impacts**

#### **3.1.3.5.1      Explanation of Detailed Impact Matrix**

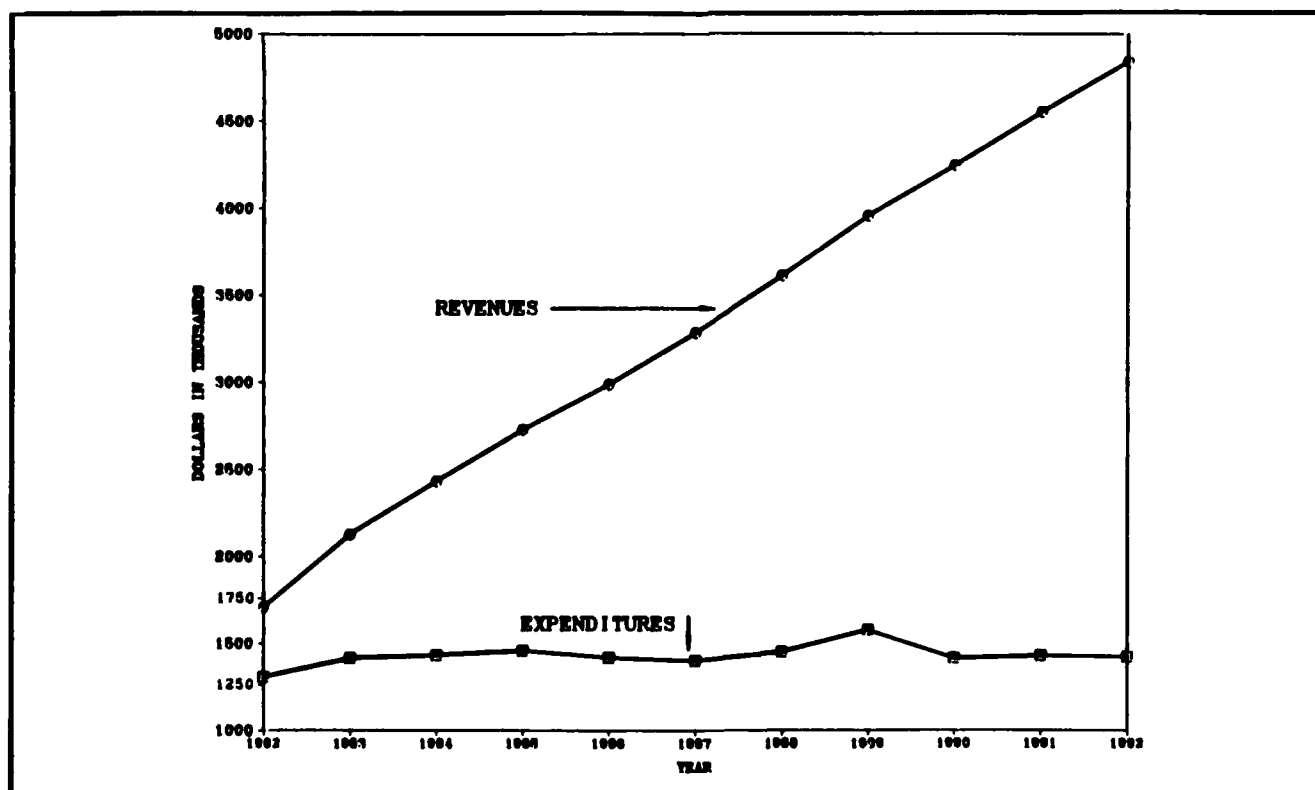
Figure 3.1.3-33 summarizes public finance impacts attributable to the proposed project. Impacts for Laramie County are expected to be potentially beneficial as increased expenditures are more than offset by project-related revenues.

Impacts for the City of Cheyenne are considered to be potentially beneficial in the short term as a result of a decline in the projected revenue-expenditure imbalance. Beneficial effects will occur in the years 1985 to 1990 as revenues are higher relative to expenditures in those years under the Proposed Action than under the No Action Alternative. In the long term, impacts are expected to be negligible and not significant as revenue-expenditure imbalances will be greater in these years.


Impacts to the Town of Pine Bluffs are expected to be potentially beneficial as increased expenditures are more than offset by increased revenues as a result of the project.













**FIGURE 3.1.3-31 REVENUE AND EXPENDITURE PROJECTIONS, KIMBALL COUNTY SCHOOL DISTRICT NO. 3 - NO ACTION (FISCAL YEAR 1982-1983 DOLLARS)**



**FIGURE 3.1.3-32 REVENUE AND EXPENDITURE PROJECTIONS, KIMBALL COUNTY SCHOOL DISTRICT NO. 3 - PROPOSED ACTION (FISCAL YEAR 1982-1983 DOLLARS)**

LEGEND		ADVERSE IMPACTS	SIGNIFICANT ADVERSE IMPACTS	PROJECT IMPACTS					
LEVEL OF IMPACT *	LOW	○	●	SHORT TERM			LONG TERM		
	MODERATE	○	●	SITE	LOCAL	REGIONAL	SITE	LOCAL	REGIONAL
	HIGH	○	●						
POTENTIAL BENEFICIAL EFFECTS									
* MEASURE OF THE AMOUNT OF ENVIRONMENTAL CHANGE									

PUBLIC FINANCE						
Laramie County						
City of Cheyenne						
Town of Pine Bluffs						
Laramie County School District No. 1						
Laramie County School District No. 2						
City of Cheyenne Board of Public Utilities						
South Cheyenne Water and Sewer District						
Platte County		○				
Town of Wheatland		○				
Town of Chugwater		●				
Platte County School District No. 1						
Kimball County		○				
City of Kimball		○				
City of Kimball Combined Utilities Fund						
Kimball County High School District No. 1						
Kimball County Elementary School District No. 3		○				

\* Impacts are those generated by construction activities and having a long duration.

FIGURE 3.1.3-33 PUBLIC FINANCE SUMMARY IMPACT MATRIX

Impacts to Laramie County School District No. 1 are high and significant in the short term, since increased expenditures are not offset by equivalent changes in revenues. The capital costs associated with the construction of new facilities requiring increases in bonded indebtedness also contribute to this rating. Impacts will be negligible and not significant in the long term.

Impacts to Laramie County School District No. 2 are expected to be negligible in the short and long term as necessary expenditures are offset by increased revenues as a result of the project.

Impacts to the Cheyenne Board of Public Utilities are considered to be negligible and not significant in the short term. Short-term beneficial effects as a result of the project will result due to increased collection of planning and engineering fees (essentially a system improvement fee) as a result of increased development.

Impacts to the South Cheyenne Water & Sewer District are considered to be potentially beneficial as the project generates revenues in excess of necessary expenditures.

Impacts to Platte County are expected to be low, short term, and not significant as cash balances are decreased by the project over a period exceeding 1 year.

Impacts for the Town of Wheatland are expected to be low, short term, and not significant as minor declines in cash balances occur as a result of the project.

Impacts for the Town of Chugwater are expected to be moderate, short term, and significant due to the uncertainty over how the Town will be able to pay for services to the projected population influx and the probable need to raise its mill levy or seek supplemental outside assistance from the county or the state.

Impacts for Platte County School District No. 1 are expected to be potentially beneficial in the short term since revenues resulting from the project will exceed expenditures.

Impacts to Kimball County are considered to be low, and not significant in the short term as cash balances must be reduced as a result of project-related fiscal requirements.

Impacts to the City of Kimball are low and not significant in the short term except in 1988 when expenditures are not offset by equivalent changes in revenues. They result from the decline in surplus and carryover funds and the effect a large but temporary increase in population will have upon public expenditure requirements. Long-term impacts are low and not significant.

Impacts to the City of Kimball Combined Utilities Fund are expected to be potentially beneficial as increased expenditures are offset by increased revenues.

Impacts to Kimball County School District No. 1 are considered to be potentially beneficial as increased expenditures are more than offset by increased revenues over more than one budget period. Kimball County School District No. 3 will receive low and not significant impacts in the short term due to temporary reductions in cash balances. Long-term impacts will be negligible and not significant.

#### 3.1.3.5.2 Aggregation of Elements, Impacts, and Significance

The various subelements were assigned relative weight based on population and overall impact determined by the majority impact. Determination of overall impact ratings for the public finance resource involved aggregation of the public finance subelements. They were

based on analysis of condition and professional experience in balancing positive and negative impacts. Overall public finance resource impacts were determined separately, by jurisdictions where appropriate for short and long-term considerations of the Proposed Action.

The overall level of impact and significance rating for public finance are moderate and significant in the short term due to the fiscal burden in Laramie County, particularly School District No. 1.

#### **3.1.3.6      Mitigation Measures**

Potential mitigation measures that will be considered are identified below. Each measure identifies the party responsible to implement, but not necessarily to pay for, the measure.

##### **3.1.3.6.1      Laramie County, Wyoming**

No mitigation measures are proposed as no adverse impacts are anticipated for Laramie County. However, a fiscal impacts monitoring system should be established for the length of the project to gauge the actual response of local fiscal conditions to population changes.

##### **3.1.3.6.2      City of Cheyenne**

No mitigation measures are proposed as no adverse impacts are anticipated for the city of Cheyenne. However, a fiscal impacts monitoring system should be established for the length of the project to gauge the actual response of local fiscal conditions to population changes.

##### **3.1.3.6.3      Pine Bluffs**

No mitigation measures are proposed as no adverse impacts are anticipated for the Town of Pine Bluffs. However, a fiscal impacts monitoring system should be established for the length of the project to gauge the actual response of local fiscal conditions to population changes.

##### **3.1.3.6.4      Laramie County School District No. 1**

- o Request funding through the Federal Impact/Disaster Aid to School District Program as further discussed in the public services and facilities section in order to aid in the financing of construction of the project-induced school building. This request should be made prior to 1986 in anticipation of project-induced increases in student enrollment. The mitigation, should funds be provided, would be highly effective. The level of impact and significance would also be reduced as it would eliminate the need for a bond issue (School District).
- o Request payment of the Public Law 81-874 entitlement amount in full for eligible "A" and "B" students during project construction years. This federal program provides aid to local school districts where enrollments are affected by federal projects or military installations. "A" students are those whose parents both live and work on federal installations, while "B" students are those whose parents work on federal installations but live elsewhere. This request should be made to the Department of Defense prior to FY 1985. Payments should be made according to the present payment schedule for P.L. 81-874 monies to the District. This mitigation would be highly effective in mitigation expenditure increases in the area of instruction, instructional support and administration as a result of project-induced expenditure increases. This mitigation could result in the lowering of the level of impact to a moderate or low designation (Laramie County School District No.1/USAF).



3.1.3.6.5 Laramie County School District No. 2

No mitigation measures are proposed as no adverse impacts are anticipated to result from the project. However, a fiscal impacts monitoring system should be established for the length of the project to gauge the actual response of local fiscal conditions to population changes.

3.1.3.6.6 South Cheyenne Water & Sewer District

No mitigation measures are proposed as no adverse impacts are anticipated as a result of the project. However, a fiscal impacts monitoring system should be established for the length of the project to gauge the actual response of local fiscal conditions to population changes.

3.1.3.6.7 City of Cheyenne Board of Public Utilities

No mitigations are proposed as adverse impacts are anticipated in the long term. The short-term adverse impact that is identified is an anomaly resulting from accelerated growth prior to 1988 which results in no additional tap or planning and engineering fees for a period of less than a year. Operating surpluses as a result of the Proposed Action are sufficient to carry the Cheyenne Board of Public Utilities through this interval without any long-term adverse effects or necessary mitigation efforts.

3.1.3.6.8 Platte County

Enact the local option 1-percent sales and use tax for the 1986 to 1988 period. This mitigation would result in the county and its municipalities becoming eligible for the State of Wyoming Impact Assistance Payment for the duration of the project construction period in Platte County. The mitigation would be highly effective and could reduce the level of impact to negligible or zero and result in overall beneficial effects (Platte County).

3.1.3.6.9 Town of Wheatland

Mitigation measures are identical to those listed for Platte County.

3.1.3.6.10 Town of Chugwater

The Town should negotiate and enter into an intergovernmental agreement with the County to pay for and provide police protection and road and physical maintenance services to the Town in the years 1985 through 1987. Such an agreement should be negotiated prior to 1985 and subject to amendment each year to respond to changing conditions. This mitigation would be highly effective in reducing negative impacts as it would ease the Town's fiscal burden and alleviate the uncertainty over how the Town could respond to a major population increase (Town, County).

3.1.3.6.11 Platte County School District No. 1

No mitigation measures are proposed as no adverse impacts are anticipated as a result of the project. However, a fiscal impacts monitoring system should be established for the length of the project to gauge the response of local fiscal conditions to population changes.

**3.1.3.6.12      Kimball County**

Mitigation measures for Kimball County are identical to those listed for the City of Kimball.

**3.1.3.6.13      City of Kimball**

Seek direct assistance through the procedure outlined in the Memorandum of Agreement for operating expenditures incurred in providing services to the project-induced population. This should occur in 1986 and 1988 when significant population immigration to the City of Kimball are projected to occur. The amount of this assistance should be equivalent to the excess in expenditures over revenues identified in Section 3.1.3.4.13.2.

**3.1.3.6.14      City of Kimball Combined Utilities Fund**

No additional mitigation measures other than those listed for the City of Kimball are proposed for the Combined Utilities Fund.

**3.1.3.6.15      Kimball County High School District No. 1**

Kimball County High School District No. 1 will not require any mitigation measures due to the Proposed Action. However, a fiscal impacts monitoring system should be established for the length of the project to gauge the response of local fiscal conditions to population changes.

**3.1.3.6.16      Kimball County Elementary School District No. 3**

Kimball County Elementary School District No. 3 will not require any mitigation measures due to the Proposed Action. However, a fiscal impacts monitoring system should be established for the length of the project to gauge the response of local fiscal conditions to population changes.

**3.1.3.7      Unavoidable Adverse Impacts**

There are no unavoidable adverse project-related impacts on any of the jurisdictions discussed above.

**3.1.3.8      Irreversible and Irretrievable Resource Commitments**

Expenditures for programmatic, operating costs, and long-term bonded debt retirement are irretrievable once incurred. Expenditures for programmatic and operating costs are reversible in that the budget process occurs each year and that allocated funds are not necessarily spent in the year in which they are allocated. Obligations for expenditures to retire bonded indebtedness are irreversible assuming that default is not a reasonable alternative.

**3.1.3.9      Relationship Between Local Short-Term Use of Man's Environment and Maintenance and Enhancement of Long-Term Productivity**

While the Proposed Action is expected to impose short-term burdens on some jurisdictions within the Area of Concentrated Study, its long-term effects may be beneficial to the maintenance of fiscal stability. Briefly, the Proposed Action will hasten the transition of the tax bases of impacted communities from a rural to an urban orientation. The growth projected for

many jurisdictions under the Proposed Action would, in all probability, occur inevitably, albeit at a later date. If the Proposed Action requires the modification of tax base and public service delivery systems at this time, it will further the goal of preparing for future growth.

Even if population increases are short run, the fiscal adaptation to them will be long run and permanent.

### **3.1.4      Construction Resources**

#### **3.1.4.1    Introduction**

This section describes economic impacts resulting from the project's construction materials purchases in the local economy. Material-related impacts can be either negative or positive. Negative impacts relate 1) to possible materials shortages, 2) to price increases resulting from these shortages, or 3) to a combined impact of shortages (delivery dates) and price increases on the general public in the Region of Influence.

Positive effects involve expanded employment opportunities resulting from additional materials purchased in the Region of Influence. These indirect employment impacts, however, are not dealt with in detail in this section. Instead such induced employment effects are treated quantitatively in the Section 3.1.1 on employment demand.

#### **3.1.4.2    Definition of Levels of Impacts**

Economic impacts are either short or long term. Long-term impacts extend beyond the 1990 construction completion period. Short-term impacts coincide with the construction period. Four impact definitions used in the subsequent analyses and ranging from negligible to high are listed below:

- o    Negligible Impact - Will produce no or little change in the capacity utilization rate of a particular materials industry but will affect regional suppliers' inventories.
- o    Low Impact - Will cause a change in capacity utilization and affect inventories of regional suppliers. This will affect the existing materials market by increasing production. Existing production facilities will be capable of satisfying this demand.
- o    Moderate Impact - Will occur when temporary shortages accompany the increased utilization of regional suppliers' capacity.
- o    High Impact - Will occur when regional suppliers reach maximum capacity utilization, inventories are exhausted and can not satisfy the increase in demand.

#### **3.1.4.3    Determination of Significance Criteria**

A material resource impact is significant if project demand denies materials to other users or causes substantial price increases.

#### **3.1.4.4    Assumptions, Assumed Mitigations, and Environmental Impacts of the Proposed Action and Project Alternatives**

**Assumptions.** It is assumed that no industrial sector has made any effort to begin stockpiling or expanding their capacity because project materials purchases would begin at the earliest in 1984 and peak during 1986 and 1987.

**Assumed Mitigations.** The construction resources section has no assumed mitigations.

**Environmental Impacts.** Impacts of materials purchases are determined by estimating regional supply for major material categories, the corresponding peak year material requirements originating with the project, and the impacts of these purchases on prices and availability.

Regional construction materials availability measures are based either on producers' estimates of 1983 average and peak capacity or on estimated 1982 sales. Project-induced demand increases of less than 5 percent were judged to cause no material shortages, delays in deliveries, or price increases. Where appropriate, local impacts are assessed based on material availability in the Cheyenne area.

An estimate of project materials requirements, expressed in 1982 dollars, is presented in Table 3.1.4-1. This table lists 25 major construction materials in accordance with Standard Industrial Classifications and estimates total dollar values for these classifications. The environmental impacts of the proposed action and project alternatives are discussed in the following subsections.

#### 3.1.4.4.1 Cement

##### 3.1.4.4.1.1 Baseline Future - No Action Alternative

Cement production in the Region of Influence is not anticipated to change. This conclusion is based on discussions with cement plant officials. Future demand is expected to reflect historical patterns with Region of Influence producers satisfying normal market demands.

##### 3.1.4.4.1.2 Proposed Action

The project requires 6,400 tons of cement. This quantity represents less than 0.5 percent of annual production capacity within the Region of Influence. Since existing production facilities are capable of handling this demand project impact is considered negligible, short-term, and not significant on the local and regional levels. Project demand for cement will not affect regional and local availability.

#### 3.1.4.4.2 Coarse and Fine Aggregate

##### 3.1.4.4.2.1 Baseline Future - No Action Alternative

Region of Influence of aggregate production for 1982 was estimated at 3.5 million tons. The production capacity of existing plants can easily expand to over 6 million tons based on a survey of existing producers. Aggregate reserves within the Region of Influence are virtually unlimited.

##### 3.1.4.4.2.2 Proposed Action

The project requires 4.6 million tons of coarse and fine aggregate during a 6-year construction period. Most of the aggregate will be used for road upgrading during 1985, 1986, and 1987. Peak demand of 1.8 million tons will occur in 1986. Project aggregate demand will have a minimal effect upon the abundant aggregate reserves in the Region of Influence. However, peak project demand represents almost 50 percent of regional production capacity which would have to expand to meet project demands. Expansion could involve both working extra shifts and expanding plant facilities. Consequently some supply problems may occur as industry production is expanded. In addition, some minor isolated price increases may occur. Because project demand may cause some temporary supply problems and price increases, the impacts are rated short term, moderate, and significant on the local and regional levels.

Project demand for coarse and fine aggregate may cause some minor isolated price increases but should not effect regional and local availability.

Table 3.1.4-1

ESTIMATED REGIONAL MARKET SHARE OF  
PEACEKEEPER MATERIALS PURCHASES

Standard Industrial Classification	Estimated Project Requirements Purchased Regionally (\$1,000)	Total 1982 Estimated Purchase 16-County Region of Influence (\$1,000)	Estimated Peak Annual Purchases As Percent of Regional Markets
Fabricated Structural Metal	12,580	46,255	5.4
Unclassified Professional Services and Products	14,358	334,908	1.0
Cement and Concrete Products	10,862	63,579	7.0
General Wholesale Trade	8,890	931,670	0.02
Structural Metal Products	1,965	2,876	13.7
Millwork, Plywood, and Wood Products	1,695	22,407	1.5
Copper, Copper Products	300	2,030	3.0
Electrical Lighting and Wiring	290	2,180	2.7
Stone and Clay Mining and Quarrying	32,999	14,769	89.6
Stone and Clay Products	464	4,181	4.6
Basic Steel Products	62	7,620	0.01
Heating and Air Conditioning Apparatus	320	2,025	3.2
Plumbing and Plumbing Fixtures	197	2,025	1.9
Petroleum Refining and Products	2,167	17,129	2.5
Material Handling Equipment	1,606	16,541	1.9
Sawmills and Planing Mills	297	6,532	0.9
Paints and Allied Products	618	5,240	2.3
Plastic Products	899	46,922	0.4
Furniture and Fixtures	397	11,169	0.7
Structural Clay Products	986	11,084	1.8
General Hardware	278	9,038	0.6
Scientific Instruments	318	11,824	0.5
Rail Transport	212	336	12.6
Real Estate	986	200,347	0.1
Construction, Mining, and Oilfield Machinery	372	30,488	0.2
TOTAL:	\$93,418	\$1,803,175	

#### **3.1.4.4.3      Ballast**

##### **3.1.4.4.3.1      Baseline Future - No Action Alternative**

In the Region of Influence, the potential supply of ballast is very large. A forecast of ballast production is not available but it is assumed to be over 900,000 tons per year based on discussions with local suppliers.

##### **3.1.4.4.3.2      Proposed Action**

The Proposed Action requires an estimated 2,800 tons of ballast which is less than 1 percent of current production. Existing facilities are capable of satisfying this demand. The economic impacts are rated negligible, short term, and not significant on the regional level.

Project demand for ballast will not affect regional and local availability and will not cause price increases.

#### **3.1.4.4.4      Asphalt**

##### **3.1.4.4.4.1      Baseline Future - No Action Alternative**

Current estimates indicate that the Region of Influence's asphalt producers are operating close to capacity. Consequently, continued improved business conditions could produce both shortages and price increases for this product.

##### **3.1.4.4.4.2      Proposed Action**

Approximately 111,000 tons or 622,000 barrels of asphalt are required for the project. Peak project demand of 255,000 barrels is expected in 1986. This induced demand represents approximately 12 percent of the region's asphalt production capacity, with producers currently operating near production capacity. Consequently, some short-term shortages and minor price increases may be expected as producers expand production to meet project demand. Because project demand may cause temporary shortages and some isolated price increases, the impact upon asphalt production is rated short-term, moderate, and significant on the local and regional level.

#### **3.1.4.4.5      Roofing**

##### **3.1.4.4.5.1      Baseline Future - No Action Alternative**

Production capacity within the Region of Influence is more than ample and may be expanded rapidly by adding more staff. According to industry sources, no shortages are expected in the next 5 years.

##### **3.1.4.4.5.2      Proposed Action**

The project will require about 5,700 rolls or a little over 1 million square feet (sq ft) of asphalt roofing. Producers of roofing indicate that ample capacity is available to meet this entire demand in less than 1 month. Consequently, no project-induced shortages or price increases are expected. Project economic impact is therefore rated not significant, short term, and negligible on the regional level.

#### 3.1.4.4.6 Plywood Lumber and Other Wood Products

##### 3.1.4.4.6.1 Baseline Future - No Action Alternative

Local suppliers of lumber and plywood import most of these materials from outside the Region of Influence. Forecasts for the nation predict plywood demand will reach 18 billion sq ft by 1986 while other lumber demand could reach 50 billion board feet also by 1986.

##### 3.1.4.4.6.2 Proposed Action

The project will require an estimated 485,000 board feet of lumber, including plywood. This requirement will increase national lumber and plywood production by less than 0.01 percent. Consequently, the impact is considered negligible, short term, and not significant on the regional level. Reduced demand for lumber products will not affect regional availability and will not cause price increases.

#### 3.1.4.4.7 Fuel

##### 3.1.4.4.7.1 Baseline Future - No Action Alternative

Fuel production and consumption data are not included in the construction resources analysis. An impact assessment was conducted by the energy resources group. Refer to Section 3.1.8.4 for this discussion.

##### 3.1.4.4.7.2 Proposed Action

Fuel needs for the project are presented in Table 1.6.7-2. A complete discussion of project impacts can be found in the energy resource analysis, Section 3.1.8.4.

#### 3.1.4.4.8 Concrete Block and Brick

##### 3.1.4.4.8.1 Baseline Future - No Action Alternative

Existing Region of Influence production capacity is about 5 million units which is less than 50 percent of capacity.

##### 3.1.4.4.8.2 Proposed Action

The project will require about 133,500 concrete blocks and bricks. Local facilities can easily meet this demand, which is approximately 0.03 percent of capacity. Impacts on concrete block and brick supply are rated negligible and not significant in the short term on the local and regional level. Project demand for concrete block and brick will not affect regional or local availability and will not cause price increases.

#### 3.1.4.4.9 Basic Steel Products

##### 3.1.4.4.9.1 Baseline Future - No Action Alternative

Basic steel products include structural steel, reinforcement steel, and steel rail. Procurement of these products occurs mostly outside the Region of Influence. Nationally, demand for structural steel is predicted to reach 8.7 million tons in 1984. Reinforcement steel production is expected to reach 4 million tons in 1984. Steel rail production could reach 800,000 tons in 1984.



#### 3.1.4.4.9.2 Proposed Action

The project will require an estimated 4,400 tons of structural steel, 3,300 tons of reinforcement steel, and 23 tons of steel rail. Project demand of these materials will increase national demand by less than 0.1 percent. The economic impacts are therefore rated negligible and not significant in the short term on the regional level. The project demand for basic steel products will not affect availability and will not cause price increases.

#### 3.1.4.4.10 Onbase Project Construction Requirements

The M-X facility list, presented in Table 3.1.4-2, indicates material requirements for certain onbase project construction.

Since several of these list items are required in relatively small quantities, 1982 material purchases were utilized as a measure of local availability and production capacity. It is believed that purchases will be made in the Cheyenne Urban Area. Based on construction labor requirements, it is evident that 1986 is the peak year when about 20 percent of total construction activity will take place. Adjusting the number of list items which can be purchased locally by this percentage, it appears that local onbase project procurement will not create any supply problems in the Cheyenne Urban Area. Consequently, the economic impacts for materials purchases indicated in the table are rated not significant and negligible in the short term on the local level with potentially beneficial effects.

#### 3.1.4.4.11 Materials Not Elsewhere Discussed

Additional project-related materials required are indicated in Table 3.1.4-1. This table shows (column 4) the estimated peak-year demand generated by the project. This peak-year demand is expressed as a percent of the total regional market (column 3). It is noted that in only 4 cases does this demand exceed 5 percent of regional capacity. For this project-related demand one might have expected both minor shortages and price increases. However, the product categories of cement and concrete products, structural metal products, stone and clay mining and quarrying, and rail transport are all material categories with substantial potential for rapid expansion of capacity without delivery delays or major price increases. Consequently, economic impacts for all of these materials are rated not significant and negligible in the short term.

#### 3.1.4.4.12 Consideration of Alternatives

The construction resource analysis considers surfacing Option B discussed in the transportation section a worst-case scenario. Construction resources impact analysis is therefore based on Option B. Other project alternatives associated with dispatch stations, buried cable paths, and onbase road alternatives will not alter construction resources availability.

### 3.1.4.5 Summary of Impacts

#### 3.1.4.5.1 Explanation of Detailed Impact Matrix

The impacts of project material purchases affecting regional and local availability of construction resources are summarized in Figure 3.1.4-1. On a regional level, the impacts for aggregate and asphalt are rated moderate and significant with potentially beneficial effects in the short term. All other materials are rated negligible and not significant with potentially beneficial effects in the short term. On the local level, aggregate and asphalt are rated moderate and significant with potentially beneficial effects in the short term. All other

TABLE 3.1.4-2

## ONBASE CONSTRUCTION REQUIREMENTS - PEACEKEEPER FACILITY LIST

Material	Quantity		SIC Code
<b>Masonry</b>			
Concrete <sup>1</sup>	7,589	cu yd	3273
Asphalt concrete <sup>1</sup>	2,206	sq yd	2951
Aggregate	618	tons	1423
Gravel	658	tons	1442
Ballast <sup>1</sup>	2,800	tons	1423
Concrete block <sup>1</sup>	102,500		3271
Brick	31,000		3271
Tile	18,140	sq ft	3252
Marble window sill	620	lf	3272
Gypsum	15,876		327
Nails	3,800	lbs	3315
Paint	8,530	gal	285
<b>Plywood and Lumber</b>			
Lumber <sup>1</sup>	70,357	bf	24
Treated timbers <sup>1</sup>	3,000	bf	24
Plywood	1,930	sheets	2431
Paneling <sup>1</sup>	200	sheets	2431
Trim	3,500	trim	2431
<b>Electrical</b>			
High intensity ring lightclusters	50		3648
Substation transformers	4		364
Relays	50		364
Meters	16		364
Entrance cable	6,400	lf	364
Copper wire	134,435	lf	364
Amp boxes	296		3644
Junction boxes	24,805		3644
Switch boxes	1,958		3644
Pumps	135		3561
Metal light standards	200		3646
Light fixtures	4,015		364
Exhaust fans	75		3634
Porcelain receptacles	870		3261
Wire	14,750	lf	364
Light switches	527		3613

Table 3.1.4-2, Continued, Page 2 of 5  
CONSTRUCTION REQUIREMENTS

Material	Quantity	SIC Code
Lightswitch panel	10	3613
Outlets	1,254	3644
Stage lights	10	3648
Bell or buzzer signals	30	364
Utility pole 40 ft	176	3646
Electrical wire	2,800 lf	364
Heavy high voltage cable	1,300 lf	364
Light fixtures 40'	400	364
Light towers 60' to 90'	50	364
<b>Steel and Metal</b>		
Steel suspension grid <sup>1</sup>	49.4 tons	3312
Reinforcing steel <sup>1</sup>	52.7 tons	3312
Structural steel for walkways <sup>1</sup>	94 tons	3312
Structural steel <sup>1</sup>	1,745.8 tons	3312
Metal stairs <sup>1</sup>	78 tons	3312
Grating for walkways <sup>1</sup>	241.7 tons	3312
Metal grate <sup>1</sup>	30.6 tons	3312
Crane rail <sup>1</sup>	36.8 tons	3312
(Steel) rail <sup>1</sup>	108.3 tons	3312
Pipe railings <sup>1</sup>	4,044 lf	3317
<b>Plumbing Tubing Piping</b>		
Copper tubing	12,940 lf	3351
Copper fittings	2,495	3351
Steel pipe	24,295 lf	3317
Steel fittings	5,308	3317
Plastic pipe	2,200 lf	3079
Plastic fittings	495	3079
Cast iron fittings	2,094	3321
Stainless steel pipe & tubing	800 lf	3317
Stainless steel fittings	160	3317
Copper pipe	200 lf	3351
Cast iron sewer pipe	10,310 lf	3321
<b>Fixtures</b>		
Septic tanks	4	3261
Commodes	248	3261
Urinals	142	3261
Lavatories	222	3261

Table 3.1.4-2, Continued, Page 3 of 5  
CONSTRUCTION REQUIREMENTS

Material	Quantity		SIC Code
Shower stalls	126		3261
Stainless steel sinks	20		3261
Water fountains	101		3261
Hot water tanks	32		3261
Fire protection sprinkler heads	6,820		3261
Grease traps	64		3261
Drain grates	61		3261
Sludge traps	6		3261
Mirrors	26		323
Hydrants	6		3261
<b>Insulation</b>			
Pipe	13,813	lf	3644
Fiberglass butts	207,200	sq ft	3644
Duct	46,500	sq ft	3644
Blown	91	tons	3644
Insulation	96,580	sq ft	3644
<b>Ceilings</b>			
Fiberglass tile	128,400	sq ft	
<b>Floors</b>			
Carpet	20,500	sq ft	227
Asphalt & vinyl tile	98,720	sq ft	295
Parquet	12,700	sq ft	2426
<b>HVAC</b>			
Air conditioners	23		3634
Duct work	106.1	tons	3444
Duct fans	70		3444
Thermostats	313		
Registers	345		
Return intakes	15		3444
Heating units	113		3634
Central heat & air units 4 tons	15		3634
Grill & register	104		
Humidifier	5		3499
Heating & cooling	10		3634

Table 3.1.4-2, Continued, Page 4 of 5  
CONSTRUCTION REQUIREMENTS

Material	Quantity	SIC Code
Return grills	6	3444
Grills	80	3444
Heat & air units	14	3634
<b>Communication</b>		
Cable	13,700 ft	3644
Receptacles & Jacks	495	3644
Switching terminals	10	3644
Phone cable	9,200 lf	3661
Phone jack	266	3661
Communication cable	93,360 lf	3661
Communication conduit	2,500 lf	3664
Lead-in cable	500 lf	3661
Conveyor system	2,100 lf	3535
Cranes 50 ton	4	3536
10 ton	10	3536
100 ton	6	3536
<b>Carpenter &amp; Millwork</b>		
Metal door or sliding	312	3442
Door frame metal exterior	73	3442
Window metal	944	3442
Doors interior	267	3442
Cabinets	2,235 lf	243
Metal lath	25,750 lf	3442
Grates for drains	264	
Metal studs	53,012 lf	3442
Wood metal interior	12	3442
Shelving metal & wood	2,100 lf	3442
Metal locks	280	3442
Vault doors	6	
Pump	1	3561
Seats	200	2431
Blackboards	540 lf	2531
Projector screens	27	
Bench	1,050 lf	3431
Base molding	5,000 lf	3431
Cove molding	5,000 lf	3431
Moveable partitions	600 lf	254
Blinds	160	
Caulking	30 gal	2851

Table 3.1.4-2, Continued, Page 5 of 5  
CONSTRUCTION REQUIREMENTS

Material	Quantity	SIC Code
Quarter round	6,000 lf	2431
Slate counter top	120 lf	
Elevator	1	3534
Cubical partitions	- aluminum studs 2,000	254
	- aluminum plates 6,000 lf	3353
	- aluminum braces 4,000 lf	254
Roof ventilators	110	3634
Dust collectors	6	
Parts & material bins	1,400 lf	3444
Metal shelving racks & bags	400 lf	3442
Window power	4	2541
Roofing (asphalt shingles)	250 sq	295
Fendering	1,000	3442
Overhead sliding or rollup	4	3442
Fencing	9,300 lf	3496
Roll roofing <sup>1</sup>	600 rolls	295
Roofing felt <sup>1</sup>	600 rolls	295
Pumps	2	3561
Metal bracing	656 lf	3442
Metal sills	1,968 lf	3442
Gates	16	
Barbed wire	21,900 rolls	3315

<sup>1</sup> Items are included in materials purchases discussion elsewhere in this section of the report. Remaining items required for any peak year are approximately one-fifth of the quantities listed. If these quantities are evenly demanded during peak requirements, the quantity impact on Cheyenne commerce would be minimal.

bf = board feet

lf = linear feet



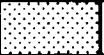











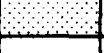
LEGEND		ADVERSE IMPACTS	SIGNIFICANT ADVERSE IMPACTS	PROJECT IMPACTS					
LEVEL OF IMPACT ★	LOW	○	●	SHORT TERM			LONG TERM		
	MODERATE	○	●	SITE	LOCAL	REGIONAL	SITE	LOCAL	REGIONAL
	HIGH	○	●						
POTENTIAL BENEFICIAL EFFECTS									
★ MEASURE OF THE AMOUNT OF ENVIRONMENTAL CHANGE									
CONSTRUCTION RESOURCES									
Cement									
Aggregate					●	●			
Ballast									
Asphalt					●	●			
Roofing									
Lumber, Plywood, and Other Wood Products									
Concrete Block and Brick									
Basic Steel Products									
Materials Not Elsewhere Discussed									
On Base Construction Requirements									
					</				

FIGURE 3.1.4-1 CONSTRUCTION RESOURCES SUMMARY IMPACT MATRIX

materials are rated negligible and not significant with potentially beneficial effects in the short term. No long term impacts are assessed for construction resources. Overall impacts on both the local and regional level are rated negligible short term and potentially beneficial on material markets because of the stimulus to existing production capacities.

#### 3.1.4.5.2 Aggregation of Elements, Impact, and Significance Rating

Figure 3.1.4-1 presents a summary of impacts for construction resources. The overall impact is negligible and not significant in the short term, and negligible and not significant in the long term.

As previously mentioned, some additional beneficial impacts may occur. For example, additional related production activity and employment generated by material purchases will increase in the Region of Influence.

Determination of the overall economic impacts for construction resources involved an aggregation method which gives equal importance to the various construction categories.

#### 3.1.4.6 Mitigation Measures

Potential mitigation or preventive measures considered are identified below. The party responsible to implement, but not necessarily to pay for, the measure is identified.

- o Methods to enhance material availability include advanced dissemination of information on project material requirements. In addition, competitive fixed price bidding procedures are recommended to minimize local material shortages and potential price increases. Any program should be implemented as early as possible in order to be most effective. The lead agency responsible for these mitigations is the Air Force.

#### 3.1.4.7 Unavoidable Adverse Impacts

There are no unavoidable adverse impacts anticipated for construction resources.

#### 3.1.4.8 Irreversible and Irretrievable Resource Commitments

The use of nonrenewable materials such as cement, aggregate, and petroleum products is an irreversible and irretrievable commitment of resources.

#### 3.1.4.9 The Relationship Between Local Short-Term Use of Man's Environment and Maintenance and Enhancement of Long-Term Productivity

Resources used in the construction of the project will result in local short-term use of the environment. However, the expansion of material markets implies that, in the long term, future expansions of these markets may be less expensive as the fixed costs of expansion have been paid.



### **3.1.5      Social Well-Being**

#### **3.1.5.1    Introduction**

This section evaluates potential project-related changes in the social well-being of communities in the Area of Concentrated Study (defined in Section 2.1.5.1.1). Both beneficial and adverse impacts are discussed, as well as the anticipated duration of the impacts.

For evaluation purposes, potential impacts have been discussed categorically as economic issues, social issues, and community value issues. The changes that may occur have been determined through an assessment of potential project characteristics, previous events experienced by the community, existing resources to deal with the changes, and community attitudes regarding the perceived issues.

#### **3.1.5.2    Definition of Levels of Impacts**

Social well-being impacts are measured in terms of changes resulting from population immigration associated with the project. As peak immigration will occur during the construction phase, short-term impacts are defined as those not exceeding the construction activities period which will end in 1990. Accordingly, long-term impacts are defined as operations activities following the construction period.

The levels of impact for social well-being are defined as follows:

- o    Negligible Impact - There are no perceived impacts affecting social organization or well-being.
- o    Low Impact - There is a recognition of impacts by the community with minimal alterations affecting social organization or well-being.
- o    Moderate Impact - There is a recognition of impacts by the community with temporary alterations affecting social organization or well-being.
- o    High Impact - There is a recognition of impacts by the community with permanent alterations affecting social organization or well-being.

#### **3.1.5.3    Determination of Significance Criteria**

Project impacts are judged significant based on the context and degree of change in one or more of the following:

- o    public health and safety of the community;
- o    controversial effects on the human environment;
- o    violation of federal, state, local, or health and safety laws;
- o    used for extensive institutional response;

#### 3.1.5.4 Assumptions, Assumed Mitigations, and Environmental Impacts of the Proposed Action and Project Alternatives

Assumptions. While the impacts on specific subgroups of the population have been considered, the determination of impact is based on changes to the collective social well-being of the impacted community.

Assumed Mitigations. No mitigations were assumed in determining the level and significance of impacts. However, where appropriate, potential mitigation measures have been identified and their potential effects on levels of impact and significance have been discussed.

Environmental Impacts. The method used to prepare the impact analysis for the project involved an evaluation of quantitative and qualitative data, describing the area in light of relevant project characteristics. The impact issues chosen for analysis were selected because of their importance in social impact literature, the local perception of those issues as major problems, and their relevance to the concepts of social organization and social change.

Environmental impacts of the proposed action and project alternatives are discussed in the following subsections.

##### 3.1.5.4.1 Laramie County, the City of Cheyenne, and Town of Pine Bluffs

###### 3.1.5.4.1.1 Baseline Future - No Action Alternative

No major changes in Laramie County are anticipated that will alter future conditions with the project. The increase in the median age of residents, especially in Pine Bluffs, is expected to continue and the population's ethnic and racial distribution is expected to remain constant in the near future.

No immediate change in the relatively high level of alcohol abuse is anticipated. Alcohol-related instances of family violence, crimes, and motor vehicle accidents are expected to continue.

In recent years, the number of immigrants who remain unemployed has been increasing in the Cheyenne area. This trend is expected to persist, causing concern over how the needs of this group may be met given scarce resources.

Current attitudes toward community growth, planning and diversity, and local objectives, are expected to remain constant with the project.

###### 3.1.5.4.1.2 Proposed Action

Although no large scale alterations to the existing social structures of Laramie County or the city of Cheyenne and the town of Pine Bluffs are anticipated as a result of the project, some exacerbation of existing problems is anticipated and beneficial effects are expected as well. Anticipated changes are summarized categorically as economic issues, social issues, and community issues.

Economic Issues. No increase in transients is projected for Pine Bluffs and therefore indigent numbers should remain constant. In Cheyenne, however, an increase in the number of indigents requiring services due to increased numbers of transients in the area is anticipated. Current shelter and resources are not considered adequate to meet increased demands. The increase in indigents is expected to create an economic impact on the local community,

community, community conflict over meeting these demands, and fewer resources for existing indigent residents. Therefore, increases in indigents represent a moderate local impact in the short term because the recognized impact will cause temporary alterations affecting both social organization and well-being. The impact is also considered significant in the short term because the increase in indigents, and the way in which increased community demands are to be met, are likely to be controversial, and may require extensive institutional response. No long-term indigent impact is anticipated because project-related transients are not expected to remain in the area past the end of the construction period.

The potential for price inflation affecting items such as food and shelter has been noted as a possible project-related problem. Inflation has occurred with growth and most adversely affects fixed-income residents. Laramie County had approximately 8 percent of its residents living below the poverty level in 1980, and an undetermined number of additional persons living on fixed incomes. Because this will have a recognizable project-related impact on the community with minimal alterations affecting social organization or well-being, the level of impact is judged low and not significant in the short term and negligible in the long term.

The issue of economic development and diversity includes concerns such as lessened employment opportunity, competition for jobs, and lessened industrial expansion due to higher project-related salaries. Although these impacts are recognizable by the community, alterations affecting social organization or well-being will be minimal and the impact level from economic development and diversity is considered low and not significant in both the short and long term. Potential beneficial effects are commercial expansion and diversification.

The overall rating for the three economic impact issues in Laramie County, the City of Cheyenne and the town of Pine Bluffs is low and not significant in the short term, and negligible in the long term. Beneficial effects are likely in both the short and long term.

Social Issues. Laramie County and Cheyennes (but not Pine Bluffs) are expected to experience an increase in transients, as previously noted. Because of the potential for perceptions of the community as a less safe place to live, the level of impact in the short term is considered moderate. Because increased numbers of transients are likely to require extensive institutional response, and potentially violate government or health and safety laws, the short-term impact is also judged significant. Long-term impacts are judged negligible because no transient-related project impacts are anticipated after the completion of construction activities.

Another category of impacts that is likely to arise with project development countywide includes increased numbers of alcohol and drug abuse, and related legal offenses, such as driving under the influence of alcohol and disturbing the peace. No consensus exists regarding the increased incidence of social problems in rapid growth areas. However, the present incidence of social problems is likely to continue among the existing population and the immigrant population may be expected to exhibit the same characteristics as the resident population.

Because there is a perception that alcoholism and alcohol-related criminal offenses are already high in Laramie County, potential increases could result in temporary alterations affecting the well-being of the society. Alcohol and substance abuse impacts are therefore considered moderate in the short term and negligible in the long term. The short term impact is also considered significant due to the potential violation of laws relating to public health and safety.

Social conflict may occur between population subgroups, such as between newcomers and existing residents or military personnel and civilians. Social conflict impacts are therefore considered moderate for Laramie County in the short term and negligible in the long term.

Because these recognized impacts could temporarily affect social well-being, the impact is considered significant in the short term due to the effects on public health and safety, violation of laws, and need for extensive institutional response.

All social issue impacts for Laramie County, Cheyenne, and Pine Bluffs collectively, represent a moderate and significant impact on social well-being in the short term and a negligible impact in the long term.

Community Issues. Lifestyle changes, immigration, government roles, and the power structure of the community are change-related issues which could impact the Laramie County communities both adversely and beneficially.

Few lifestyle changes with minimal alterations affecting social organization or well-being are expected to occur as a result of the project. For this reasons the potential impact is considered low and not significant in the short term. The impact on long term social well-being is considered negligible.

Because lifestyle changes may enhance community well-being through social diversification, the impact is also judged potentially beneficial in both the short and long term.

There are no perceived impacts affecting social organization or well-being in Laramie County as a result of minor population fluctuations due to immigration, government roles, or power structure issues. This is because the county is accustomed to immigration, especially military-related, and government roles and the power structure are not expected to be noticeably altered. Beneficial effects due to immigration could occur in both the short and long term including social diversification, and increased recreational and social opportunities.

In Laramie County, the summary impact for the community issues of lifestyle, immigration, government roles and power structure is judged negligible and potentially beneficial in both the short and long term.

The aggregate impact for social well-being issues in Laramie County, the City of Cheyenne, and the town of Pine Bluffs is low and not significant in the short term and negligible in the long term, with potential beneficial effects in both the short and long term.

#### 3.1.5.4.2 Platte County and the Town of Wheatland, Town of Chugwater

##### 3.1.5.4.2.1 Baseline Future - No Action Alternative

No large industrial developments, such as the recent power plant construction, are expected to occur in Platte County in the near future and, therefore, no extraordinary population growth is expected. Given these factors, it is unlikely that any major changes will occur in the social organization or well-being of Platte County residents except in response to normal growth.

The county is likely to remain predominantly rural in the near future, and community values regarding outdoor recreational facilities, open space, and rural lifestyle are likely to persist. Increasing threats to livestock and wildlife as use of rural roads increases, potential vandalism, increases in thefts, and littering of the rural countryside are present concerns that will become more important in the future if growth continues.

#### 3.1.5.4.2.2 Proposed Action

Social well-being impact issues will be discussed for Platte County and the towns of Wheatland and Chugwater, and the levels of impact and significance will be assigned in the same manner as for Laramie County and the City of Cheyenne.

Economic Issues. As in Laramie County, indigents in Platte County are expected to place some additional burden on residents. Since no transient facilities exist, community groups will face increased demands for services.

In Platte County, nearly 10 percent of its residents lived below the poverty level in 1980. These persons, plus those residents living on fixed incomes, are likely to be impacted by price inflation.

Project-related economic development and social diversity issues are judged to have beneficial short and long-term effects on the community. Competition for project-related jobs, and potential decreases in the growth rates after conclusion of the construction phase could also produce adverse impacts.

In all three of these economic categories, levels of impact were judged low in the short term, because minimal alterations affecting social organization or well-being are anticipated, and negligible in the long term. The short-term impacts were also considered not significant.

The aggregate of the three economic issues for the county was considered low and not significant in the short term and negligible in the long term, with potentially beneficial effects in both the short and long term.

Social Issues. Less than 50 project-related transients are expected on any given day during the year. Although this number is not large, it can cause some community disruption and increase in social problems. Community recognition of this problem, given past experiences and the expectation of minimal alterations affecting the social organization or well-being, resulted in a low level of impact and a not significant rating in the short term for transients and a negligible level of impact in the long term.

The same potential problem for alcohol and substance abuse ascribed to Laramie County is expected to occur in Platte County especially because social and recreational opportunities in Platte County are very limited, and alcohol abuse is already considered to be a problem. Because these concerns are recognized by the community, and may exert potential temporary affects on social well-being, the impact is considered moderate in the short term and negligible in the long term. The impact is also judged significant in the short term due to effects on public health and safety, and the potential violation of laws.

Social conflict issues are rated identical to alcohol and substance abuse issues in Platte County because they represent similar problems and evoke similar types and levels of community response.

The overall rating for all three of the social issue categories in Platte County is therefore considered moderate and significant in the short term and negligible in the long term.

Community Issues. In a rural community, such as Platte County, some disruption to the area's lifestyle and community social structure is likely to occur with major development projects. Surplus job-seekers, unaccustomed to living in rural communities and observing livestock control and safety measures, may have a disruptive effect on rural lifestyles. The impact level is considered low and not significant in the short term, however, because minimal alterations

affecting social organization and well-being are projected. Long-term lifestyle impacts are considered negligible, and beneficial effects in terms of social diversity are likely in both the short and long term.

Few facilities and organizations exist in Wheatland or Chugwater to promote newcomer integration. Some project-related newcomers who prefer the rural setting are expected to choose residence in Platte County. The county is therefore expected to experience a low but not significant level of impact in the short term in relation to immigration and a negative impact in the long term. Impact may be potentially beneficial due to the addition of new people, talents, and other positive attributes.

A negligible impact on government roles is anticipated in both the short and long term for Platte County because of the small number of immigrants and the limited duration of their stay.

A low, not significant impact on the community power structure in the short term is anticipated because in Chugwater the small population is conducive to some power changes, and the number of immigrants as a proportion of the population is high. This impact is considered negligible in the long term.

The aggregate level of impact rating for the four community issue categories in Platte County is therefore considered low and not significant in the short term, and negligible in the long term. Beneficial effects are anticipated in both the short and long term as indicated above.

The county's aggregate level of impact is rated low and not significant in the short term, and negligible in the long term, with potential beneficial short and long-term effects.

#### 3.1.5.4.3 Kimball County and the City of Kimball

##### 3.1.5.4.3.1 Baseline Future - No Action Alternative

Without the Proposed Action, the median age of residents in Kimball County should continue to increase. The current declines in the county's population due to outmigration, like other demographic trends, are likely to continue.

Unlike Platte County residents, who have been concerned about some of the effects of recent growth, Kimball County residents are concerned because their local economy is declining. The county's low tax base and limited social and recreational opportunities are likely to continue unless changes occur to bolster and diversify the economy.

##### 3.1.5.4.3.2 Proposed Action

Economic, social, and community issues for social well-being in Kimball County are evaluated as follows:

Economic issues. Increased numbers of surplus job-seekers are expected to be low in Kimball County. A total of 24 transients are expected daily during the peak year, with 13 potentially requiring services. Because Kimball County already has a relatively high percentage of persons living below the poverty level (12.6 percent), and others on fixed incomes, even a small increase represents economic demands which may impact the community. Therefore, a low, not significant level of indigent-related impact is indicated in the short term and a negligible impact is expected in the long term.

Price inflation is expected to affect Kimball County's low and fixed-income groups in the same way as in Laramie and Platte Counties. Therefore impacts, for the same reasons, are judged low and not significant in the short term, and negligible in the long term.

The level of impact for economic development and diversity are rated moderate and significant in both the short and long term for Kimball County. This is because the county is more economically stagnant than the other two counties and competition for higher paying project-related positions is likely to occur. Some beneficial economic effects could occur as well, due to project-related business expansion.

Overall economic impacts for the county are judged low and not significant in both the short and long term. Probable beneficial effects are also indicated.

Social Issues. Kimball County's social issues ratings and the rationale for them are identical to Platte County's ratings in this category.

Transient-related impacts are considered low and not significant in the short term and negligible in the long term. Alcohol and substance abuse and social conflict are both considered moderate and significant in the short term and negligible in the long term.

Therefore, the aggregate rating for social issue impacts in Kimball County is considered moderate and significant in the short term, and negligible in the long term.

Community Issues. With the exception of the power structure issue, impact levels, significance, and the rationale for these decisions are identical for Platte and Kimball Counties. A low and not significant level of impact in the short term is anticipated in Kimball County for effects on lifestyle and immigration. Beneficial short and long-term effects are also expected. Negligible short and long-term impacts on government roles and the power structure are indicated in Kimball County.

The overall rating for the four community issues is therefore low and not significant in the short term and negligible in the long term, while potentially beneficial effects in both the short and long term are anticipated.

The impacts on economic, social, and community aspects of well-being in Kimball County are judged, in aggregate, low and not significant in the short term and negligible in the long term.

#### 3.1.5.4.4 Quantity Distance Zones - Relocation Effect

Another impact that is likely to occur is the relocation of a few existing residents in areas within the Quantity Distance Zones of the Launch Facilities. There are nine such residences throughout the region and options will be presented to the owners of these residences, including the opportunity to sell their residences and improvements to the U.S. government. If the owners exercise their option to relocate, changes to the rural communities in which these residences are located could occur. The potential impact on these communities is judged low and significant in the short term. The impact is considered significant because the issue is potentially controversial. Negligible impacts are anticipated in the long term for displacement because the effects of such action would not extend beyond the project's construction period.

### 3.1.5.5 Summary of Impacts

#### 3.1.5.5.1 Explanation of Detailed Impact Matrix

Figure 3.1.5-1 shows the impacts for Laramie, Platte, and Kimball counties and the aggregate rating for all of them. The matrix is an equal rating of the overall impacts of social well-being for each of the entities and element indices described in the previous analysis. Major changes are not anticipated with regard to the social structure of the communities as a result of the project.

#### 3.1.5.5.2 Aggregation of Elements, Impacts, and Significance

Aggregated elements, impacts, and significance for social well-being indicate a low, not significant level of project-related impact in the short term, and a negligible level of impact in the long term. Beneficial impacts relating to social well-being are also anticipated in both the short and the long term.

Determination of overall impact ratings for social well-being involved the aggregation of the subelement and jurisdictional ratings as follows. Both negative and positive effects of the Proposed Action were considered by social research and planning professionals, and levels of impact and significance were assigned to each subelement and jurisdiction based on their judgments, in accord with stated impact level and significance definitions.

In aggregating the subelements within each jurisdiction, values were assigned to individual impact levels and an average level of impact calculated for each jurisdiction. The levels of significance were combined into a jurisdictional summary.

Jurisdictional evaluations were averaged, giving equal value to each jurisdiction, to arrive at an aggregate evaluation for the entire Area of Concentrated Study. An exception to the above methodology was made in determining the level of impact and significance for the Quantity Distance Zone subelement. This subelement was not rated by individual jurisdictions, but rather for the combined Area of Concentrated Study entity. The Quantity Distance Zone level of impact and significance rating was then averaged into the jurisdictional summary in the same manner as the other subelements to arrive at the final assessment.

### 3.1.5.6 Mitigation Measures


Potential mitigation measures that will be considered are identified below in order of priority. Each measure identifies the party responsible to implement, but not necessarily to pay for, the measures.

#### 3.1.5.6.1 Transient/Indigent Programs

- o An expanded program, to discourage surplus job-seekers from outside the area and provide information on the availability of project-related employment, would reduce transient numbers if established several months prior to the start of construction. Such a program could be carried out by public agencies.
- o As noted in the human services section, provision of adequate shelter, facilities, information and referrals, and food for surplus job-seekers and transients could be coordinated through a center specifically established to deal with this population. Such a center could be established several months in advance of demand by public agencies, reducing the transient impact and significance levels, and decreasing community disruption.



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LEGEND		ADVERSE IMPACTS	SIGNIFICANT ADVERSE IMPACTS	PROJECT IMPACTS					
LEVEL OF IMPACT *	LOW	○	●	SHORT TERM			LONG TERM		
	MODERATE	○	●	SITE	LOCAL	REGIONAL	SITE	LOCAL	REGIONAL
	HIGH	○	●						
POTENTIAL BENEFICIAL EFFECTS									
★ MEASURE OF THE AMOUNT OF ENVIRONMENTAL CHANGE									





















SOCIAL WELL BEING						
LARAMIE COUNTY AND THE CITY OF CHEYENNE, TOWN OF PINE BLUFFS						
ECONOMIC ISSUES						
Indiqents						
Price Inflation						
Economic Development and diversity						
SOCIAL ISSUES						
Transients						
Alcohol and Substance Abuse						
Social Conflict						
COMMUNITY ISSUES						
Lifestyle						
Immigration						
Government Roles						
Power Structure						

FIGURE 3.1.5-1 SOCIAL WELL BEING SUMMARY IMPACT MATRIX



Page 3 of 1


LEGEND		ADVERSE IMPACTS	SIGNIFICANT ADVERSE IMPACTS	PROJECT IMPACTS						
LEVEL OF IMPACT ★	LOW	○	●	SHORT TERM			LONG TERM			
	MODERATE	○	●	SITE	LOCAL	REGIONAL	SITE	LOCAL	REGIONAL	
	HIGH	○	●							
POTENTIAL BENEFICIAL EFFECTS										
★ MEASURE OF THE AMOUNT OF ENVIRONMENTAL CHANGE										
KIMBALL COUNTY AND THE CITY OF KIMBALL					○					
Economic Issues					○			○		
Indigents					○					
Price Inflation					○					
Economic Development and Diversity					●			●		
SOCIAL ISSUES					●					
Transients					○					
Alcohol and Substance Abuse					●					
Social Conflict					●					
COMMUNITY ISSUES					○					
Lifestyle					○					
Immigration					○					
Government Roles										
Power Structure										
QUANTITY DISTANCE ZONE DISPLACEMENT					●					

FIGURE 3.1.5-1 Continued

SOCIAL WELL BEING SUMMARY  
IMPACT MATRIX

- o A shelter could be established and run by either public agencies or private volunteer groups such as churches or service organizations.

Each of these measures could potentially reduce the transient/indigent impacts, but in combination, their effectiveness would be enhanced.

#### Individual and Social Problem Programs:

- o Educational programs dealing with the problems of family violence and existing support services for individuals experiencing these problems could be planned in advance and implemented during the early stages of the project by public agencies, reducing individual and social problem impacts associated with the relocation and assimilation of immigrants.
- o Establishment of programs, by public agencies, to deal with the full range of alcohol abuse problems (such as the coordination of effective alcohol treatment, provision of transportation from drinking establishments for intoxicated patrons, and suggestions for alternatives to drinking as a form of entertainment) could minimize individual and social problem impacts associated with the project.

These programs could be effective means of providing information dealing with domestic violence and alcohol abuse and could be established by public agencies such as mental health or domestic violence centers, or by private voluntary groups. In addition to potential reductions in individual and social problems, a program which provides transportation to alcohol abusers would also reduce numbers of alcohol-related accidents, arrests and fatalities.

#### Information and Integration Programs:

- o The utilization of a social integration program for new and existing residents, and distribution of printed information on the effects of relocation could reduce the impact and significance levels associated with the social adjustment and integration of newcomers. An example of such a program was developed by the Nida Training & Development Group in Novato, California. It specializes in relocation to the southwest region of the United States. The program includes video tapes and books on employee and family relocation problems and measures to minimize the effects of relocation. This type of program could be implemented through project contractors, public agencies or private volunteer groups.
- o A newcomer integration program, implemented by private or public agencies, to provide information and encourage community involvement and social interaction would effectively decrease impacts related to both individual and community adjustment. Similar programs have proven effective in other impact areas and in new town communities both in the U.S. and abroad.

#### 3.1.5.6.2 Monitoring Programs

The following social well-being issues could be monitored by public agencies or private contractors in order to provide data on actual occurrences and needs. Information could be collected in the following areas to increase the effectiveness of other proposed mitigation actions:

- o Human services
- o Work force profile and characteristics; and
- o Social and community change.

#### 3.1.5.7 Unavoidable Adverse Impacts

A potential for increased numbers of injuries and fatalities exists with all construction projects. This potential for unavoidable adverse impacts therefore exists for the proposed project, but the extent of the potential impact is unknown. A possible increase in injuries and fatalities may also occur as a result of population increases and potential rises in the rates of alcohol abuse.

#### 3.1.5.8 Irreversible and Irretrievable Resource Commitments

Accidental loss of human life, livestock, and other domestic animals and wildlife, as a result of accidents, is an irretrievable resource which may be a result of the project.

#### 3.1.5.9 Relationship Between Local and Short-Term Use of Man's Environment and Maintenance and Enhancement of Long-Term Productivity

Project-related impacts on social well-being, both beneficial and adverse, could cause changes in the social make-up of the region, but would especially affect certain population subgroups, and could affect the future provision of certain services. Project-related changes, on the other hand, could lead to the maintenance and enhancement of long-term productivity if they are carefully planned and monitored. For example, if job training were incorporated into project work, long-term social productivity could be enhanced; if action were taken to mitigate project impacts, agency service-related productivity could be enhanced in the long term; if effort were expended to enhance newcomer integration, the community could derive long-term benefit from decreased human service demands and increased diversity, community involvement by the new residents, and the voluntary services these residents might later provide.

### **3.1.6      Public Services and Facilities**

#### **3.1.6.1      Introduction**

This section describes the impacts of the Proposed Action in the Area of Concentrated Study on education, law enforcement, the justice system, fire protection, health care, human services, general government, and libraries.

A governmental jurisdiction is included within the Area of Concentrated Study if population directly attributable to the project causes the rate of population growth within that jurisdiction to exceed 5 percent over baseline growth in any given year. In general, communities that experience less than a 5 percent growth level in any given impact year do not approach threshold levels for public services and facilities. Consequently, an impact growth rate of greater than 5 percent could create excessive service and facility burdens on jurisdictions. Based on this justification, Laramie County, Wyoming, Cheyenne, Wyoming, and Pine Bluffs, Wyoming; Platte County, Wyoming, Chugwater, Wyoming, and Wheatland, Wyoming; and the city and county of Kimball, Nebraska, fall within the Area of Concentrated Study. The city of Cheyenne and Laramie County are also included because they are the focal points for project activities and population influx.

The information in this section is based upon data and detailed analysis contained in the Public Services and Facilities Environmental Planning Technical Report.

#### **3.1.6.2      Definition of Levels of Impact**

The following definitions of levels of impact were developed to classify potential direct and indirect impacts of the project. Levels of impact are concerned with the relative severity or the degree of change of an impact as compared to a baseline. The following impact level definitions are closely tied to increases in population over baseline conditions. All public service demands are primarily driven by population. The basic assumption is that individuals will always place a demand on public services and facilities. Consequently, any increase in population will also initiate an increase in the demand for public services. The levels of impact were determined by threshold levels of existing services and are expressed by the following definitions:

- o      Negligible Impact - Would result when expenditures made to service the impact population can be accommodated within existing departmental budgets, and would not require an internal transfer of funds, additional staffing or major equipment, or additions of major capital facilities.
- o      Low Impact - Would result when, due to the Proposed Action, departmental budgets must be supplemented through the internal transfer of existing revenues, but would not require additional full-time staffing or major capital equipment, or additions of major capital facilities.
- o      Moderate Impact - Would result when additional staffing or major equipment are required as a result of the Proposed Action, also would result when project-related demand would require less than 50 percent of a major capital facility.
- o      High Impact - Would result when project-related demand requires the construction of at least 50 percent of a major capital facility.

### 3.1.6.3 Determination of Significance Criteria

The following conditions were considered in determination of impact significance. The impact under consideration was deemed significant if:

- o The impact affects public health or safety, when the impact is greater than what could be expected under normal growth conditions;
- o The impact is likely to be highly controversial, i.e., to be of major concern to the affected political jurisdiction or institution; or
- o The action or its impact threatens the violation of some federal, state, or local law or requirements imposed for the protection of the environment.

### 3.1.6.4 Assumptions, Assumed Mitigations, and Environmental Impacts of the Proposed Action and Project Alternatives

Assumptions. Upon completion of the inventory of existing conditions, the baseline future for the No Action Alternative was forecast in order to establish projected future conditions for each element within the Area of Concentrated Study. The relationship between population increases, service delivery levels, special requirements, programmatic changes in existing services, and cost was established. Extensive interviews with local officials were held to determine if programmatic changes are planned that could modify service standards.

The age-cohort/survival model developed for this project was an important component in determining the demographic characteristics of the future population and how their subsequent impacts would affect public services. Levels of service provision were then projected for all eight elements, i.e., education, law enforcement, etc.

Methods used to project public service impacts with the Proposed Action are similar to those used in establishing baseline conditions for the No Action Alternative. The major methodological difference is that potential degradations or improvements in service levels were examined based on the specific characteristics of the impact population and agency capacities.

Public service and facility impact levels were both qualitatively and quantitatively examined. Increases in staffing, major equipment, and other special requirements for maintenance of local service delivery levels were identified.

Assumptions for public services and facilities are presented below:

- o Demand for public services and facilities is a function of population;
- o Public services will remain available for all residents within a specific governmental jurisdiction; and
- o Service levels will remain at 1983 levels when forecast under baseline conditions unless otherwise indicated.

Assumed Mitigations. For the public services analysis, there are no assumed mitigations.

Environmental Impacts. Environmental impacts of the Proposed Action and project alternatives are discussed in the following subsections.

### 3.1.6.4.1 Education

#### 3.1.6.4.1.1 Laramie County Baseline Future - No Action Alternative

Laramie County School District No. 1. Projected future student enrollments for Laramie County School District No. 1 are shown in Figure 3.1.6-1. These projections exclude nonpublic enrollment and full-time public special education enrollment. These projections summarize a continual increase for elementary school enrollment and stable secondary school enrollment. Student-to-teacher ratios are assumed to hold constant under the No Action Alternative. It is anticipated that with the No Action Alternative, educational services such as special education, gifted programs, and nonpublic education will experience growth in enrollments.

Although two new public elementary schools are being constructed, one is to replace an existing rural facility, and overcrowding at other schools will fill them both to capacity upon their completion. With no other plans to construct new schools and enrollments projected to rise, conditions for the District's elementary schools are predicted to become even more crowded under the No Action Alternative during the analysis period. For secondary school facilities, enrollments are predicted to keep existing facilities at capacity from 1983 to 1992.

Laramie County School District No. 2. Moderate enrollment increases are anticipated for Laramie County School District No. 2. As with School District No. 1, most of the increase will be found at the elementary level. Staffing increases would be minimal. There are construction plans for an addition to the Pine Bluffs Elementary School and a grades K-8 school in Burns, which would replace Hillsdale School.

Post-secondary education, while not a part of School District No. 2, is anticipated to continue to expand in Laramie County under baseline future conditions.

#### 3.1.6.4.1.2 Platte County School District No. 1 Baseline Future - No Action Alternative

Student enrollments were projected for Platte County School District No. 1 for 10 years. It is anticipated that elementary enrollments will increase steadily each year. The junior high school enrollment will increase at a rate that will result in a net increase of 20 students (from 256) in 10 years. The 512 senior high school students are expected to follow a similar pattern whereby the 10-year projection is 35 students more (from 512). Overall, there are increased staffing needs projected in Platte County District No. 1. Due to excess capacity, no changes in the Platte County School District No. 1 facilities will occur during 1983 to 1992 with the No Action Alternative.

#### 3.1.6.4.1.3 Kimball County Baseline Future - No Action Alternative

Public school enrollments for the Kimball County School system were projected by grade level for the No Action Alternative. Overall enrollment is projected to decrease until 1986 and then rise for the balance of the period, due mainly to increased elementary enrollment.

Future student-to-teacher ratios were assumed to remain the same as current conditions. Due to excess capacity, no changes in Kimball County School system facilities will occur during 1983 to 1992 with the No Action Alternative.



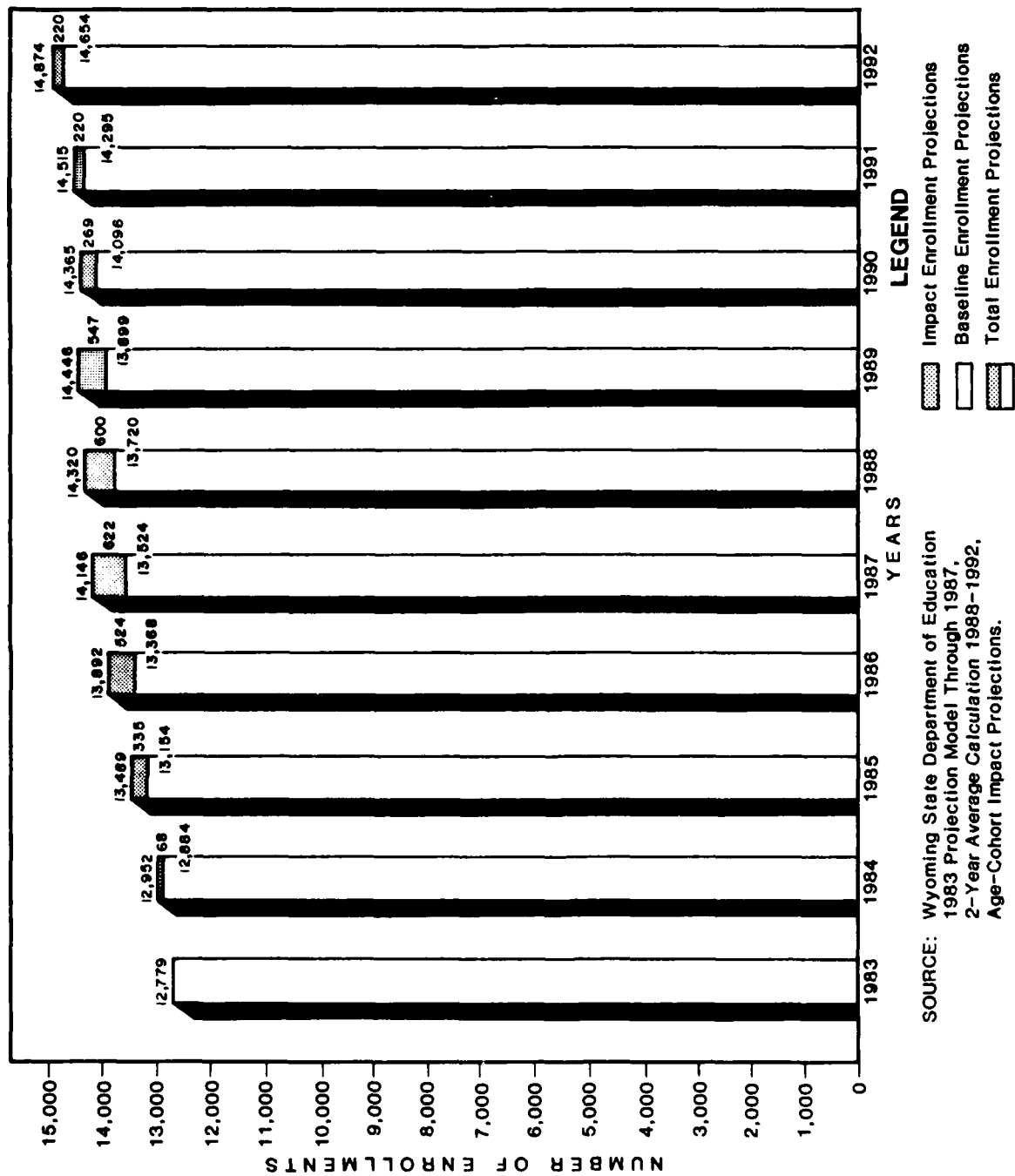


FIGURE 3.1.6-1 PROJECTED ENROLLMENTS GRADES K-12, LARAMIE COUNTY SCHOOL DISTRICT NO. 1

**Laramie County School District No. 1.** Increases in student enrollments due to the Proposed Action were projected for elementary and secondary grade levels in Laramie County School District No. 1 for 1983 to 1992 and are shown in Figure 3.1.6-1 as the shaded area. Increased enrollments begin for all grade levels in 1984 and last through 1992. The peak year of impact is 1987 when the Proposed Action is projected to result in 4.6 percent more students than the No Action Alternative. More importantly, the Proposed Action will cause a need in 1987 for the District to provide for 4.4 percent more students in already overcrowded elementary schools. Based on 1982 capacity figures for three grade levels, the 1987 enrollments projected with the Proposed Action will result in the following:

- o Approximately 700 more elementary students than rated capacity (recognizing kindergarten students as 0.5 full-time equivalent). 47 percent of this amount is due to the Proposed Action;
- o Approximately 100 students more than rated capacity at the junior high level (all project related); and
- o Approximately 300 students exceeding capacity at the high school level (50 percent due to the Proposed Action).

Not only will the impact on enrollments be more severe for the elementary grade level, but the problem will be focused on the Northwest cluster. Currently this cluster contains 50,000 square feet (sq ft) less than 1983 space standards, and it is projected to be 36-percent oversubscribed according to existing capacities and projected neighborhood distributions.

District staffing requirements due to the Proposed Action are 33 teachers, 8 other certified staff, and 17 noncertified staff in the peak impact year of 1987. Lesser numbers in proportion to enrollments will be required in the other years of the 1984 to 1992 period. In addition to staff increases, substantial classroom space will be required as a result of the Proposed Action. Based on 122 sq ft per student, the projected increased enrollments will require 40,260 sq ft of added classroom space at the peak year of impact for elementary students, approximately the equivalent size of an elementary school. Based on increased enrollments, five additional school buses are projected to be needed due to the project by 1987, beginning with one in 1984.

Overall, the impacts of the Proposed Action will require the District to accommodate a relatively large number of secondary students from 1986 through 1989 and somewhat lower amounts for the balance of the analysis period, and to accommodate the total number of students projected with the No Action Alternative for 1989 in the year 1986. For the post-1989 time period, enrollments will be accelerated by approximately 1 year. In view of the fact that the Proposed Action will require additional expenditures, increased staffing, and the addition of classroom space, the impact of the Proposed Action on Laramie County School District No. 1 and its students is considered to be high and significant in the short term, and high, not significant in the long term. The short-term impact is significant because impacts of this magnitude on education tend to be controversial.

**Laramie County School District No. 2.** The student impact population in Laramie County School District No. 2 is projected to be 38 in 1988. It is projected that eight additional staff members including teachers, other certified staff, and noncertified staff are needed as a result of the Proposed Action. Because the Pine Bluffs Elementary is currently crowded, additional space may be needed as a result of the Proposed Action to accommodate the increased elementary enrollment. Therefore, the impact of the Proposed Action is considered to be

moderate and significant in the short term, and negligible, not significant, in the long term. Short-term significance is based on the potential for controversy over adding students to the already overcrowded Pine Bluffs Elementary School.

3.1.6.4.1.5 Platte County School District No. 1  
Proposed Action

The project-related student impact population in Platte County School District No. 1 is projected to be 25 in 1985, 121 in 1986, and 62 in 1987. In 1986, 15 additional staff members are projected to be needed. The staff needs in 1985 and 1987 are in proportion to the peak needs of 1987. No additional space is projected to be needed, but an additional school bus is projected for 1986. Therefore, impacts are judged to be moderate and not significant in the short term and negligible, not significant, in the long term.

3.1.6.4.1.6 Kimball County Proposed Action

With only small and temporary population increases projected for Kimball County, parallel increases in student enrollments are projected. During 1989, the peak year of increase, 79 students (45 elementary and 34 secondary) are projected to enroll in the system as a result of the Proposed Action. There is projected to be a need for six new classroom teachers and an additional school bus, but no additional space. Therefore, impacts are moderate but not significant in the short term, and negligible, not significant, in the long term.

3.1.6.4.2 Law Enforcement

3.1.6.4.2.1 Laramie County Baseline Future -  
No Action Alternative

With the No Action Alternative and attendant population increases, the Laramie County Sheriff's Department is projected to maintain its 1983 levels of service for officers and cars as shown in Table 3.1.6-1 throughout the analysis period of 1984 through 1992. Construction of a new, city/county law enforcement facility is projected for 1986 and will add substantial space to the Sheriff's Department. The staff projected for the Department through 1986 who would be in the existing Departmental space (excluding the five new employees who would work in the present City Jail) will have difficulty being accommodated in the present facility. It is likely that the Department will have to lease additional space to accommodate the additional employees until the new facility is completed. Administrative space for the Sheriff's Department is projected to increase from 2,071 sq ft to 36,300 sq ft.

3.1.6.4.2.2 City of Cheyenne Baseline Future -  
No Action Alternative

The City of Cheyenne Police Department is projected to maintain its 1983 levels of service throughout the analysis period with the No Action Alternative for officers and cars. With the occupation of the joint city/county law enforcement facility, work space (excluding jail facilities) is projected to increase to 43,230 sq ft. The additional five staff projected for the Department will exacerbate already crowded conditions in the Department, but the existing space should nevertheless be sufficient to accommodate all Department employees until the new law enforcement facility is completed in late 1986. Table 3.1.6-2 illustrates projected service levels for 1984 through 1992 with the No Action Alternative.

Table 3.1.6-1

LARAMIE COUNTY SHERIFF'S DEPARTMENT  
FUTURE STAFF AND VEHICLE NEEDS

Year	Staff						Vehicles					
	Population			Sworn			Civilian			Marked		
	Baseline	Impact	(2)	Baseline	Impact	(3)	Baseline	Impact	(3)	Baseline	Impact	Unmarked
	(1)	(1)	(2)	(3)	(4)	(5)	(3)	(4)	(5)	(3)	(4)	(5)
1984	71,248		300	68	1	0	22	0	0	15	0	0
1985	72,911	1,425		69	3	1	23	1	0	15	1	0
1986	74,246	2,425		71	5	2	23	2	1	16	1	0
1987	75,859	2,650		72	5	3	24	2	1	16	1	1
1988	77,437	2,600		74	5	2	24	2	1	16	1	1
1989	79,157	2,325		75	4	2	25	1	1	16	1	1
1990	80,777	1,200		77	1	1	25	0	0	17	0	0
1991	82,545	925		78	1	1	26	0	0	17	0	0
1992	84,165	925		80	1	1	26	0	0	18	0	0

(1) Projected population under baseline conditions.

(2) Projected population increase attributable to the Proposed Action.

(3) Total number needed under projected baseline based on existing service levels of 0.95 sworn officers per 1,000 total county population and 0.33 civilian employees, 0.22 marked cars, and 0.28 unmarked cars per sworn officer. Number of sworn staff has been adjusted to reflect the addition of five sworn jailers when the Sheriff's Department assumes operation of the Cheyenne City Jail in July, 1984.

(4) Additional number needed over baseline under the Proposed Action based on twice the existing service levels during the years when growth rates and/or project-related population are high (1984 through 1989): i.e., 1.9 sworn officers per 1,000 "impact" population. Other ratios remain the same but result in greater numbers since they are based on the number of sworn officers. Existing service levels are used for 1990, 1991, and 1992.

(5) Additional number needed over baseline under the Proposed Action based on existing service levels.

Table 3.1.6-2

## CHEYENNE POLICE DEPARTMENT FUTURE STAFF AND VEHICLE NEEDS

Year	Staff						Vehicles						
	Population		Sworn		Civilian		Marked		Unmarked				
	Baseline	Impact	Baseline	Impact	Baseline	Impact	Baseline	Impact	Baseline	Impact			
	(1)	(2)	(3)	(4)	(5)	(3)	(4)	(5)	(3)	(4)		(5)	
1984	49,140	203	86	1	0	0	21	0	17	0	18	0	0
1985	50,280	983	88	3	2	1	21	1	18	1	18	1	0
1986	51,200	1,682	90	6	3	1	22	1	18	1	19	1	1
1987	52,300	1,859	92	6	3	1	22	1	18	1	19	1	1
1988	53,380	1,723	93	6	3	1	22	1	19	1	20	1	1
1989	54,570	1,632	95	6	3	1	23	1	19	1	20	1	1
1990	55,690	816	97	1	1	0	23	0	19	0	20	0	0
1991	56,880	605	100	1	1	0	24	0	20	0	21	0	0
1992	58,020	605	102	1	1	0	24	0	20	0	21	0	0

(1) Projected population under baseline conditions.

(2) Projected population increase attributable to the Proposed Action.

(3) Total number needed under projected baseline based on existing service levels of 1.75 sworn officers per 1,000 total city population and 0.24 civilian employees, 0.20 marked cars, and 0.21 unmarked cars per sworn officer. Number of civilian staff has been adjusted to reflect the loss of five civilian jailers when the Sheriff's Department assumes operation of the Cheyenne City Jail in July, 1984.

(4) Additional number needed over baseline under the Proposed Action based on twice the existing service levels during the years when growth rates and/or project-related population are high (1984 through 1989): i.e., 3.50 sworn officers per 1,000 "impact" population. Other ratios remain the same but result in greater numbers since they are based on the number of sworn officers. Existing service ratios are used for 1990, 1991, and 1992.

(5) Additional number needed over baseline under the Proposed Action based on existing service levels.

3.1.6.4.2.3      Town of Pine Bluffs Baseline Future -  
No Action Alternative

Since the population of Pine Bluffs is projected to increase in population from 1,117 persons in 1983 to 1,245 persons in 1992, no substantive changes in the Pine Bluffs law enforcement system are projected.

3.1.6.4.2.4      Platte County Baseline Future -  
No Action Alternative

With the population of Platte County projected to increase by 22 percent (2,100 persons) between 1983 and 1992, attendant increases in staff, vehicles, and space for the Platte County Sheriff's Department are also projected. By 1992, 2 additional deputies and patrol cars would be required as would 2 new civilian employees and 268 sq ft of office space.

3.1.6.4.2.5      Town of Wheatland Baseline Future -  
No Action Alternative

Based on maintaining estimated 1983 levels of service in light of projected population increases, one additional sworn officer would be required in 1986 and another in 1990. Although no additional civilian employees or unmarked cars would be needed, one additional marked car would be required in 1990. Additional space needs by 1992 total 142 sq ft.

3.1.6.4.2.6      Town of Chugwater Baseline Future -  
No Action Alternative

With population expected to increase from 230 persons in 1983 to 310 in 1992, no additions to staff or equipment are projected. If necessary, the Town Marshall could dedicate more time to law enforcement.

3.1.6.4.2.7      Kimball County and City of Kimball  
Baseline Future - No Action Alternative

With the No Action Alternative, Kimball County and the city of Kimball are expected to decrease in population very slightly. No changes in existing conditions from 1984 to 1992 for either the Kimball County Sheriff's Department or the City of Kimball Police Department are anticipated.

3.1.6.4.2.8      Laramie County Proposed Action

If the Sheriff's Department is to maintain its present and projected level of service delivery, additional staff and cars will be necessary to serve the increased population in Laramie County due to the Proposed Action as shown in Table 3.1.6-1. Because the demand for law enforcement services for project-related immigrant population may be disproportional to the existing per capita demand, a sensitivity range was developed that presents service demand at a low end (current per capita level) and a high end (disproportional). Even at the disproportional rate of staffing, the joint law enforcement facility to be built under baseline conditions should prove sufficient for office space.

The Sheriff's Department may have to provide backup support to the Cheyenne Police Department should demonstrations against the project occur in the city of Cheyenne.

Due to the projected need for additional staff and vehicles, impacts on law enforcement in Laramie County are considered to be moderate and significant in the short term and moderate, not significant in the long term. Short-term impacts are significant because of the potential for controversy surrounding demonstrations, including the concern of local law enforcement officials over their ability to respond, as well as controversy in the community and the potentially disproportionate effects on public safety.

#### 3.1.6.4.2.9 City of Cheyenne Proposed Action

If the City of Cheyenne Police Department is to maintain its present and projected levels of service delivery with the Proposed Action, additional officers and patrol cars will be necessary to serve the increased population. Future staffing for either the proportional or disproportional projection could be accommodated in the joint law enforcement facility to be built under baseline conditions. Additional needs for staff and vehicles are shown in Table 3.1.6-2. In addition to the projected overall impacts, other, more specific, impacts due to the Proposed Action are projected. Should demonstrations result from the Proposed Action, the Cheyenne Police Department will be required to respond to such civil disturbances, which will require additional expenditures. In addition to Department response, there are several sources of backup for situations of this type such as the Laramie County Sheriff, the Wyoming State Patrol, and the Wyoming National Guard. All of these options involve costs to the taxpayer. The Police Department could be called upon to provide backup support to the Sheriff's Department should demonstrations against the project occur in the county.

Due to the projected need for additional staff and vehicles, impacts on law enforcement in the city of Cheyenne are considered to be moderate and significant in the short term, and moderate but not significant in the long term. Short-term impacts are significant because impacts could be controversial (especially as they relate to the discussion above on potential demonstrations) and because of potential disproportionate effects on public safety.

#### 3.1.6.4.2.10 Town of Pine Bluffs Proposed Action

Population increases in Pine Bluffs due to the Proposed Action are projected to be 25 persons in 1986 and 150 persons in 1988. Although 150 persons represents a fairly large percentage increase, this relatively small absolute number of persons would not require any additional staff, facilities, or equipment. Impacts are considered to be negligible and not significant in both the short and long term.

#### 3.1.6.4.2.11 Platte County Proposed Action

Based on a peak-year population increase in 1986 of 525 persons (5.3 percent), no additional staff, vehicles, or space would be required for the Platte County Sheriff's Department due to the Proposed Action. Impacts are considered to be negligible and not significant in both the short and long term.

#### 3.1.6.4.2.12 Town of Wheatland Proposed Action

Due to a peak population increase of 475 persons (9.9 percent) in 1986, 1 additional officer would be required for 1986 only. Based on this staffing increase, impacts are considered to be moderate and not significant in the short term and negligible, not significant in the long term.

3.1.6.4.2.13 Town of Chugwater Proposed Action

Based on relatively low population increases and the fact that Chugwater recently had a larger population, impacts due to the Proposed Action are considered to be negligible and not significant in both the short and long term.

3.1.6.4.2.14 Kimball County and City of Kimball  
Proposed Action

In view of the small and temporary increase in population projected for Kimball County, no changes in staff, vehicles, space, or level of service delivery for the Kimball County Sheriff's Department are projected to occur as a result of the Proposed Action. As such, impacts on county law enforcement are projected to be negligible and not significant.

The City Police Department would require one additional staff in 1989 even though the level of staff, vehicles, and space is the same as when the city's population was substantially larger. Impacts from the added population due to the Proposed Action are therefore expected to be moderate and not significant in the short term, and negligible, not significant in the long term.

3.1.6.4.3 Justice System

3.1.6.4.3.1 Laramie County Baseline Future -  
No Action Alternative

Based on projected population increases, caseloads are expected to increase for the County Court during 1984 to 1992. Based on this increase and the fact that the Court is at capacity now, it is projected that the addition of a part-time (one-third full-time equivalent) judge in 1987 will be necessary to prevent a serious degradation in service levels. Conversion of the new part-time judge to one-half full-time equivalent would be necessary in 1989. In 1992 a full-time judge position is justified. Increased use of the shared courtroom will also be required through 1987, as will expansion of current computerization and records microfilming. After 1987 an additional courtroom will be needed.

Total caseload for the District Court is expected to increase by nearly 20 percent by 1992. A corresponding increase in use of the shared courtroom, staff for the Court, the District Attorney's office and the Public Defender's office will be required during this period.

3.1.6.4.3.2 City of Cheyenne Baseline Future -  
No Action Alternative

The caseload for Cheyenne Municipal Court is expected to increase for the same reasons that the County Court's is expected to increase under the No Action Alternative for 1983 to 1992. The part-time judge is projected to work more hours during 1984 to 1992. The addition of one support staff member is projected to occur during this period. No new space will be required.

The City Attorney's office is expected to expend additional staff time during 1984 and 1985. An additional staff attorney will be needed by 1986 along with one support person and some office reorganization.



3.1.6.4.3.3      Town of Pine Bluffs Baseline Future -  
No Action Alternative

Based on a 1983 population of 1,117, the number of cases per capita is 0.1074. By 1992 the Court's caseload is projected to rise to 134 as the town's population rises to 1,245. The Court's existing staff and facilities should be able to absorb this increase without augmentation.

3.1.6.4.3.4      Platte County Baseline Future -  
No Action Alternative

Based on a direct relationship between population growth and caseload, it is projected that Platte County Justice Court caseload will increase over the 1983 to 1992 analysis period by approximately 22 percent. It is projected that 1983 staffing levels will be adequate until 1988 when an additional part-time lay judge would be necessary. No additional space for this judge or time from the deputy clerk should be necessary, although support for the deputy clerk would be necessary.

The Platte County Attorney's office should be able to adequately handle the additional prosecutions through 1987, when restoration of the part-time deputy attorney position would be necessary. No increase in space would be required.

3.1.6.4.3.5      Town of Wheatland Baseline Future -  
No Action Alternative

Wheatland Municipal Court's caseload is expected to grow with population during 1983 to 1992. Based on past performance through 1980, when population exceeded the projected 1992 level, expansion of the Court system would not be required. In addition, the Town Attorney's office should also be able to provide adequate services through 1992.

3.1.6.4.3.6      Town of Chugwater Baseline Future -  
No Action Alternative

Based on a 1983 population of 230, the court's caseload is approximately 0.104 cases per capita. By 1992 the town's population will grow to 310 when the court's annual caseload will increase to around 32. Existing staff and facilities should be adequate to absorb this increase.

3.1.6.4.3.7      Kimball County Baseline Future -  
No Action Alternative

Due to stable population, there are not expected to be any substantial changes in staff, space, caseload, or backlog for the Kimball County Court or the District Court with the No Action Alternative. Service levels are projected to remain constant during 1983 to 1992.

3.1.6.4.3.8      Laramie County and City of Cheyenne  
Proposed Action

Due to population increases generated by the Proposed Action, additional staff and space needs for both County and Municipal courts identified with the No Action Alternative will be required approximately 1 year earlier as a result of increased caseloads due to the Proposed Action. No other impacts on the courts are anticipated due to the Proposed Action. Because expenditures will increase and staff and space additions will be required earlier than under baseline projections, impacts on the County Court are rated moderate but not significant in the

short term. Impacts are considered to be negligible and not significant in the long term. Impacts on the Municipal Court are considered low and not significant in the short term and negligible, not significant in the long term.

3.1.6.4.3.9 Town of Pine Bluffs Proposed Action

Under project impact conditions Pine Bluffs is estimated to receive population immigration of 25 and 150 in 1986 and 1988, respectively. This population would increase caseloads for the 2 years by 3 cases in 1986 and 16 cases in 1988.

Existing staff and facilities should be able to absorb the caseload increase and the baseline increase without augmentation, therefore, impacts are considered negligible and not significant in both short and long terms.

3.1.6.4.3.10 Platte County, Towns of Wheatland and Chugwater Proposed Action

Due to low projected population increases in Platte County, and the towns of Wheatland and Chugwater, no additional staff, equipment, or space are projected to be required as a result of the Proposed Action. However, for the County Court, additional expenditures may be necessary due to the project. As such, impacts are considered to be low and not significant in the short term and negligible in the long term. Impacts on Wheatland and Chugwater Municipal courts are considered negligible and not significant in the short and long term.

3.1.6.4.3.11 Kimball County Proposed Action

The low projected population increases due to the Proposed Action combined with the projected decline in caseload and backlog for the Kimball County Court system under the No Action Alternative will create impacts on the Kimball County Court and its level of service that are projected to be low and not significant in the short term and negligible, not significant in the long term.

3.1.6.4.4 Fire Protection

3.1.6.4.4.1 Laramie County Baseline Future - No Action Alternative

In order to maintain existing service levels with the No Action Alternative for firefighters and firefighting vehicles, Laramie County Fire District No. 1 will need to add 3 more volunteers, 2 more fire trucks, and 514 sq ft of fire station space by 1992. Fire District No. 2 is projected to need 4 additional volunteer firefighters, 1 additional vehicle, and an additional 823 sq ft of station space by 1992.

The area served by Laramie County Fire District No. 5 is projected to grow in population gradually from about 1,200 persons in 1983 to about 1,350 persons in 1992. This growth will require one additional volunteer through 1992, but no other changes in volunteers, vehicles, or equipment.

The F.E. Warren AFB Fire Department is not expected to require any changes in staffing, vehicles, or space needs.

#### 3.1.6.4.2

#### City of Cheyenne Baseline Future - No Action Alternative

The Cheyenne Fire Department is projected to rebuild and enlarge existing Fire Station No. 2 by 1986 under the No Action Alternative. In addition, as population increases, the Department is projected to increase staff and firefighting vehicles in order to maintain its existing level of service. This will mean an additional 17 firefighters, three additional firefighting vehicles, and one additional car by 1992. The Department will also require an additional 6,390 sq ft of station space by 1992, 4,063 sq ft of which is to be provided by the enlargement of Fire Station No. 2.

#### 3.1.6.4.3

#### Platte County, Towns of Wheatland and Chugwater Baseline Future - No Action Alternative

With the No Action Alternative, the area served by the Wheatland Fire Department and the Wheatland Rural Fire District is projected to increase in population from 5,200 persons in 1983 to 6,720 persons in 1992. In order to maintain estimated 1983 service levels, joint requirements from 1983 through 1992 for the District and Department are approximately 1 additional volunteer per year; 1 additional firefighting vehicle in 1986, a second in 1989, and a third in 1992; and additional facility space totaling 2,592 sq ft by 1992.

The Chugwater Rural Fire District can reasonably be expected to accommodate projected population increases without increases in staffing, equipment, or space. This is primarily due to the modest population increases in the area. Over the 1984 to 1992 period, population is projected to increase by only 70 persons. This small number of additional people would not necessitate increased fire protection services for the area.

#### 3.1.6.4.4

#### Kimball County and City of Kimball Baseline Future - No Action Alternative

Based on stable populations for both Kimball County and the city of Kimball, the respective fire departments are projected to maintain constant levels of staffing, facilities, equipment, and levels of service with the No Action Alternative for 1983 to 1992.

#### 3.1.6.4.5

#### Laramie County Proposed Action

With population increases expected to occur in Fire District No. 1 during portions of the analysis period as a result of the Proposed Action, additional firefighters, vehicles, and space will be required to prevent degradation of service levels. Table 3.1.6-3 illustrates that projected needs represent accelerations of baseline needs. Because staff, a vehicle, and a small amount of space may be needed, the short-term impact on the District and its customers is considered to be moderate and not significant. Since no long term needs for staff, vehicles, or space were identified, the long-term impact is considered to be negligible and not significant. Fire District No. 2 would require one additional volunteer but no vehicles or station space over baseline demand, thus creating a moderate, not significant, short-term impact and a negligible, not significant, long-term impact.

Based on the relatively low level, short-term population increases projected for Laramie County Fire District No. 5 and Pine Bluffs, no increases in staff, equipment, or space are necessary with the Proposed Action. Impacts are considered to be negligible and not significant for both the short and long term.

Table 3.1.6-3

**LARAMIE COUNTY FIRE DISTRICT NO. 1  
FUTURE VOLUNTEER, VEHICLE, AND SPACE NEEDS**

Year	Population		Volunteers <sup>3</sup>		Firefighting Vehicles <sup>4</sup>	
	Baseline <sup>1</sup>	Impact <sup>2</sup>	Baseline	Impact	Baseline	Impact
1984	6,570	73	13	0	7	0
1985	6,720	336	13	1	7	0
1986	6,840	535	14	1	8	1
1987	6,990	591	14	1	8	1
1988	7,130	541	14	1	8	1
1989	7,290	518	15	1	8	1
1990	7,440	299	15	1	8	0
1991	7,620	249	15	0	8	0
1992	7,760	249	16	0	9	0

<sup>1</sup> Total population without the Proposed Action.

<sup>2</sup> Total additional population attributable to the Proposed Action.

<sup>3</sup> Calculated on the basis of the existing service ratio of 2.0 volunteers per 1,000 population.

<sup>4</sup> Calculated on the basis of the existing service ratio 1.1 firefighting vehicles per 1,000 population.

It is not anticipated that the F.E. Warren AFB Fire Department would experience demands greater than current Minuteman service demands. Consequently, impacts in both the short and long terms would be negligible, not significant.

3.1.6.4.4.6 City of Cheyenne Proposed Action

In order to maintain levels of service in Cheyenne in the face of population increases projected to result from the Proposed Action, the Cheyenne Fire Department will need to add firefighters, as shown in Table 3.1.6-4. As the table indicates, the Proposed Action requirements up to 1992 represent accelerations of baseline future needs for staff and vehicles. The impact is thus considered to be moderate and not significant for the short and long term.

3.1.6.4.4.7 Platte County, Towns of Wheatland and Chugwater Proposed Action

Although Wheatland is projected to receive population increases in 1985, 1986, and 1987, projected population levels are still below 1980 population. Since the two fire protection agencies to be affected, Wheatland Fire Department and Fire District 1F, are at nearly the same strength as 1980, no additional staff, vehicles, or space would be necessary with the Proposed Action. Impacts are considered to be negligible and not significant in both the short and long term.

Because of the small size and short duration of the population increase projected for Chugwater, no additional staff, vehicles or space would be necessary due to the Proposed Action. Impacts are considered to be negligible, not significant, in both the short and long term.

3.1.6.4.4.8 Kimball County and City of Kimball Proposed Action

The small and temporary population increases for the area served by the Kimball County Rural Fire District and the City of Kimball Fire Department with the project are projected to have negligible, not significant impacts on fire protection in both the short and long term for both entities.

3.1.6.4.5 Health Care

3.1.6.4.5.1 Laramie County Baseline Future - No Action Alternative

Baseline population projections for Laramie County indicate that by 1992 there will be a total need for 294 hospital beds, or 6 less than currently available in the 2 civilian hospitals. County Memorial Hospital is projected to receive most of the demand from the additional baseline population. This will create a potential need in 4 areas: expansion of the obstetrics unit, expansion of the radiation therapy unit, need for a heliport for emergency air transport, and the development of a 10 to 15-bed closed psychiatric unit.

The number of primary care physicians will need to be increased to maintain existing health care service levels. An additional 11 to 12 physicians will be required by 1992. The need for approximately seven to nine more dentists is also projected for the same period.

Table 3.1.6-4

CHEYENNE FIRE DEPARTMENT  
FUTURE STAFF AND VEHICLE NEEDS

YEAR	Population <sup>1</sup>		Staff <sup>3</sup>		Firefighting Vehicles <sup>4</sup>		Cars <sup>5</sup>	
	Baseline	Impact <sup>2</sup>	Baseline	Impact	Baseline	Impact	Baseline	Impact
1984	49,140	203	92	0	12	0	8	0
1985	50,280	983	94	2	13	0	8	0
1986	51,200	1,682	96	3	13	0	8	0
1987	52,300	1,859	98	3	13	0	8	0
1988	53,380	1,723	100	3	13	0	9	0
1989	54,570	1,632	102	3	14	0	9	0
1990	55,690	816	104	2	14	0	9	0
1991	56,880	605	106	1	14	0	9	0
1992	58,020	605	108	1	15	0	9	0

<sup>1</sup> Total city population under baseline.

<sup>2</sup> Total additional population attributable to the Proposed Action.

<sup>3</sup> Calculated on the basis of the existing service ratio of 1.87 staff per 1,000 population.

<sup>4</sup> Calculated on the basis of the existing service ratio of 0.25 firefighting vehicles per 1,000 population.

<sup>5</sup> Calculated on the basis of the existing service ratio of 0.16 cars per 1,000 population.

The Public Health Department is projected to continue to have problems with service provision if the Department remains at its present staffing level and location. Currently there is a need for a public health nurse and a field sanitarian. The needed addition of a sanitarian for the Environmental Health Division of the Health Department with associated equipment and office space, and an animal control officer, will further strain an already inadequate facility.

An additional problem facing the Health Department is the decision by School District No. 1 to no longer provide throat cultures on a routine basis at the schools. The Health Department will be impacted to an undetermined extent by the decision.

3.1.6.4.5.2      Platte County Baseline Future -  
No Action Alternative

Projected baseline populations for Platte County indicate a steady growth of approximately 2.2 percent annually through 1992. Since Platte County Memorial Hospital is currently (1983) operating at less than 45-percent occupancy, services provided to the projected additional 2,100 persons should not be affected. The 1992 demand for additional hospital beds is predicted to be seven. The physician staff may have to be expanded to accommodate the increased population.

Based on existing capacity, no change in the level of provision of emergency medical services is anticipated to result from baseline growth. The Public Health Department may have to increase public health nursing staff slightly to accommodate baseline future growth. While the current workload does not indicate a need for a full-time sanitarian, future population increases may require one. Both nursing homes and dentists are likely to receive increases in demand for services.

3.1.6.4.5.3      Kimball County Baseline Future -  
No Action Alternative

Baseline population projections for Kimball County indicate a decrease in population between 1983 and 1992. This reduction should not affect hospital services in the county. Existing levels of physicians, dentists, and other health personnel are not expected to change over the baseline period.

3.1.6.4.5.4      Laramie County Proposed Action

The immigrant population will cause short-term impacts on hospital facilities and personnel; however, existing levels of service are generally adequate to accommodate the increase. The number of licensed beds will not be increased because of the project; project-related population will create a demand for a total of only nine beds in 1987, the peak year of construction. However, the project may require an acceleration in the provision of certain services. In particular, the obstetrics unit of County Memorial Hospital may have to be expanded to accommodate the immigrating population.

The project-related population will result in increased demands on emergency medical services, particularly during peak years of construction (1985 to 1987). Existing services are generally adequate and would be able to accommodate the increased service levels. The primary concern regarding emergency medical services is over potential injuries at the missile construction sites; however, the Military Assistance to Safety and Traffic helicopter would be available for severe trauma patients. The rural ambulance services could experience some difficulties in locating sites.

Between 1985 and 1990, project-related population will place increased demands on the Public Health Department. Demands will peak in 1987 when the peak construction workforce is in Laramie County; by 1991 demand will return to baseline levels. Increased demands from construction workers and their families will be for immunizations, well-child clinics, blood pressure clinics, and similar services. Incoming transients seeking jobs on the project are of particular concern because they may need assistance to pay for health care. The projected trend of a younger population may result in higher birthrates for an area that already has a high rate. With this trend comes increased demands for pregnancy tests, prenatal classes, immunizations, etc. There is also concern over the potential for higher incidences of teenage pregnancy and communicable diseases.

Additional staffing needed under the No Action Alternative will not be adequate to accommodate the service demand increase due to the Proposed Action. Additional workload can be anticipated, and one additional paraprofessional person would be required for project-related immigrants. While impacts on the City-County Health Unit would be moderate, overall impacts on health care are rated low and significant in the short term. Due to the concern over conditions at the City-County Health Unit, potential impacts on health and safety, and the controversy surrounding increases in services, the short-term impacts on health care are rated significant. Long-term impacts are negligible and not significant.

#### 3.1.6.4.5.5 Platte County Proposed Action

Based on a maximum increase of 500 persons in peak year 1986, the project-related population would create a demand for less than 2 hospital beds. Hospital services would be able to accommodate increased demands without addition to staff, budget, or facilities. Impacts on health care services in Platte County were determined to be negligible and not significant in both the short and long term.

#### 3.1.6.4.5.6 Kimball County Proposed Action

Based on a maximum increase of 119 persons due to the project in the peak year, health services will be able to accommodate increased demands without additions to staff, budget, or facilities. Impacts on health services in Kimball County were determined to be negligible and not significant in both short and long terms.

#### 3.1.6.4.6 Human Services

##### 3.1.6.4.6.1 Laramie County Baseline Future - No Action Alternative

Projected baseline future population for Laramie County under the No Action Alternative indicates increases which will create additional demand for human services. Clientele increases will increase the length of waiting lists for those agencies currently at capacity. These will include the Cheyenne Halfway House, the Department of Public Assistance and Social Services, Grandma's Safe House, and the Attention Home.

Several agencies are projected to require increases in staffing under the No Action Alternative. These include Alcohol Receiving Center/Halfway House, Department of Public Assistance and Social Services, Community Center on Domestic Violence/Grandma's Safe House, YWCA Rape Crisis Center, Salvation Army, Community Interagency Board (NEEDS, Inc.), Youth Alternatives, Southeast Wyoming Mental Health Center, F.E. Warren Mental Health Clinic, Cheyenne Housing Authority, day care centers, and the STRIDE Learning Center. The other agencies will



experience increases in caseloads. However, no increases in staffing are foreseen. Detailed baseline projections of staffing, facility, and program changes are contained in the Public Services and Facilities EPTR.

3.1.6.4.6.3 Kimball County Baseline Future -  
No Action Alternative

The projected stable baseline future population will stabilize demand for those human services available in Kimball County. Consequently, service provision is expected to remain level.

3.1.6.4.6.4 Laramie County Proposed Action

The agencies projected to experience baseline increases in the length of their respective waiting lists are also projected to increase those waiting lists under the Proposed Action. Of the 22 human service agencies analyzed, 4 are projected to receive the greatest impact as a result of the project. These four agencies are the Alcohol Receiving Center, the Laramie County Branch of the Southeast Wyoming Mental Health Center, Cooperative Ministries for Emergency Assistance (COMEA) shelter, and the Salvation Army. The impact is projected to be moderate and significant for these agencies in the short term and negligible, not significant in the long term.

Should a disproportional demand for alcohol abuse services arise, the Alcohol Receiving Center and Cheyenne Halfway House would be impacted. Increases in client demand over baseline conditions could range from approximately 2 percent in 1984 to 16 percent in the peak year of 1987. This would include individuals using the 24-hour detoxification facility, and would necessitate adding a new staff member in the peak year. The impact on both services would be rated as moderate and significant in the short term and negligible, not significant in the long term. Short-term significance is based on the potential for controversy surrounding a disproportional increase in alcohol abuse. Under the most conservative scenario, alcohol abuse could increase 16 percent in the peak year over baseline conditions.

The other substance abuse agencies, New Morning Awareness House, Alcohol Traffic Safety, Pathfinder, and Project Hope, are projected to receive low, not significant impacts in the short term and negligible, not significant impacts in the long term. F.E. Warren AFB's Social Action would receive a moderate, not significant, short-term impact and a negligible, not significant, long-term impact.

Personal and family services such as the Department of Public Assistance and Social Services and the YWCA Rape Crisis Center would receive moderate, not significant impacts in the short term and negligible not significant impacts in the long term. The moderate impacts are due to the need for four additional staff for the Department of Public Assistance and Social Services and one additional staff for the Rape Crisis Center in the peak year of immigration. The welfare caseload, including the demand for food stamps, may slightly decrease during the project period as local project-related employment offsets additional welfare demand associated with immigrants. Welfare caseloads could increase as construction on the project comes to an end. However, the existing organizational structure of the Department of Public Assistance and Social Services should be able to accommodate the increased demand for welfare services at project's end. The project impacts on the Department of Public Assistance and Social Services will be moderate but not significant in the short term, and negligible, not significant in the long term. The Community Center on Domestic Violence and the Cottonwood YWCA would both experience low impacts in the short term that are not significant and negligible, not significant, long-term impacts.

Transient immigration resulting from individuals searching for, but not necessarily finding, employment will impact the COMEA shelter and the Salvation Army. As volunteer agencies, their ability to expand capacity is limited. Consequently, an overflow of transients needing shelter may occur that could not be accommodated by these organizations.

The impact on the COMEA and the Salvation Army is rated moderate and significant in the short term and negligible, not significant in the long term. The moderate impact is based on the potential need for four additional staff members for COMEA and one for the Salvation Army. Short-term significance is based on the potential for controversy surrounding service delivery to transient immigrants and the potential for unmet need resulting from limited capacity of these primarily volunteer agencies.

Other agencies which provide services to transients and indigents, such as Community Action Agency of Laramie County, Solar Greenhouse, and Wyoming Food Clearinghouse, are projected to receive low, not significant short-term impacts and negligible, not significant impacts in the long term. The Community Interagency Board (NEEDS, Inc.) is expected to receive a moderate (one additional peak year staff person), not significant short-term impact and a negligible, not significant long-term impact.

The two youth agencies, Youth Alternatives and the Attention Home, are both projected to receive moderate, not significant, short-term impacts (one peak year staff person each) and negligible, not significant long term impacts.

For the Southeast Wyoming Mental Health Center, client increases are expected for the 25 to 39-year age group during the project period. Under worst-case conditions this would represent a 1 to 11-percent increase in usage over No Action projections. With an increase in client caseloads, two staff members may be required. This could include an additional staff member for the 24-hour emergency services. The addition of these staff members will need to occur by 1987, thus creating a local short-term, moderate impact for this agency. This impact on the center will be significant due to the potential for disproportional increases in mental health caseloads which could potentially cause controversy in the community. Under the most conservative scenario mental health caseloads would increase 11 percent in the peak year over baseline conditions. Types of treatment problems expected to be encountered include call counseling/therapy dealing with marital maladjustment, neuroses, and depressive and emotional disorders. Added demands for testing, evaluation, and therapy for younger clients are projected to begin in 1986 and 1987.

The F.E. Warren AFB Mental Health Clinic is projected to receive a moderate, not significant short-term impact and negligible, not significant long-term impact. The moderate short-term impact is based on a potential need for one additional staff person. The Cheyenne Housing Authority and the day care centers are projected to receive negligible, not significant impacts in both the short and long terms. Private day care centers may require some additional staffing. Any staffing increases will be met by user fees and therefore are not considered to create public service impacts. The impact on public certifications of day care centers will be negligible and not significant.

The STRIDE Learning Center is projected to receive a moderate, not significant, short-term impact. Long-term impacts are projected to be negligible and not significant. The moderate impact rating is applied because of the potential need for one additional staff person in the peak year.

#### 3.1.6.4.6.5

#### Platte County Proposed Action

Human services short-term impacts on Platte County are projected to be moderate but not significant due to a projected need for an increase in staffing at the Platte County office of the Department of Public Assistance and Social Services. Due to client increases during the project period, facility space may become crowded. This would especially be true with the addition of impact-related staffing. Long-term impacts are projected to be negligible. Impacts on the Mental Health Center are projected to be negligible, not significant in the short and long terms.

#### 3.1.6.4.6.6

#### Kimball County Proposed Action

Low impacts in both the short and long term are projected for the Community Action Agency and the Panhandle Mental Health Center in Kimball County. During the peak project year (1989), one additional staff member may be needed for the Department of Social Services, creating a moderate, not significant short-term and negligible long term impact on this agency. Impacts on the Head Start program are projected to be negligible, not significant in both short and long terms.

#### 3.1.6.4.7

#### General Government

##### 3.1.6.4.7.1

##### Laramie County Baseline Future - No Action Alternative

Laramie County general government is not projected to make any major organizational or administrative changes under the No Action Alternative for 1983 to 1992. Staffing levels are projected to increase with population, but only 50 percent as fast since approximately this amount of the general government workload is related directly to population. Projected general government staffing increases are shown in Table 3.1.6-5.

##### 3.1.6.4.7.2

##### City of Cheyenne Baseline Future - No Action Alternative

For Cheyenne, revenue and expenditure projections indicate that general government expenditures will increase only slightly during the analysis period. For this reason, general government staffing could hold constant. Demand, however, would increase over existing levels. Table 3.1.6-6 illustrates the staffing projections for Cheyenne general government with the No Action Alternative for 1983 to 1992. Space requirements for Cheyenne general government are expected to increase slightly over the analysis period.

##### 3.1.6.4.7.3

##### Town of Pine Bluffs Baseline Future - No Action Alternative

With the No Action Alternative, Pine Bluffs population is projected to increase by 128 persons during the period from 1983 through 1992. This small increase in population is not likely to result in any substantive changes in the general government of Pine Bluffs.

##### 3.1.6.4.7.4

##### Platte County Baseline Future - No Action Alternative

With the population increases projected for the No Action Alternative, Platte County is expected to grow by about 2 percent per year, but still attain a 1992 population less than its 1980 population. Nevertheless, slight staffing increases of one person in 1987, 1989, and 1992 are predicted. No substantive changes in organization, capital facilities, or capital equipment are projected.

Table 3.1.6-5

LARAMIE COUNTY GENERAL GOVERNMENT  
PROJECTED STAFFING  
1984 TO 1992

	1984	1985	1986	1987	1988	1989	1990	1991	1992
Baseline Staff (FTE)	88.0	88.5	89.3	90.3	91.3	92.3	93.3	94.4	95.4
Additional General Government Staff due to Proposed Action (FTE)	0.4	1.7	2.9	3.2	3.1	2.7	1.4	1.0	1.0
Total Baseline plus Proposed Action (FTE)	88.4	90.2	92.2	93.5	94.4	95.0	94.7	95.0	95.4

Source: Baseline general government staffing derived from payroll data and interviews with elected officials. General government departments in 1983 had 87 full-time equivalent (FTE) employees broken down as follows: County Commissioner (4); County Clerk (28); County Treasurer (17); County Assessor (14); County Attorney (2); County Engineer (3); County Agent (4); Water Commissioner (1); Elections (3); Microfilm (2); Civil Defense (3); and 911 (6).

Table 3.1.6-6

CITY OF CHEYENNE GENERAL GOVERNMENT  
PROJECTED STAFFING  
1984 TO 1992

	1984	1985	1986	1987	1988	1989	1990	1991	1992
Baseline Staff	96.0	98.3	100.5	102.6	104.7	107.0	109.3	111.6	113.8
Impact Demand for Staff	0.6	2.0	3.3	3.7	3.5	3.3	1.6	1.2	1.3
Impact Demand for Space	75	250	413	463	438	413	200	150	163

Source: Baseline general government staff in 1983 was 95 persons broken down as follows: City Council (10); Mayor's Office (6); City Attorney (4.5); Administrative Services (2); Accounting (5); Personnel and Employee Development (4.5); Data Processing (3); Office of Purchasing (4); Office of the City Clerk (6); Word Processing (2); Zoning, Site Plans, and Nuisance Control (4); Building, Plumbing, and Electrical Permits (4); Public Works Permits (2); Municipal Building and Building Housekeeping (15); Building Maintenance (6); City Planning (10); and Parking Meters and City Center Parking (7). Employment numbers obtained from Labor Authorization/Assigned List by Department of 10/20/83. Space requirements projected at 125 sq ft per person.

3.1.6.4.7.5

Towns of Wheatland and Chugwater Baseline  
Future - No Action Alternative

Although both Wheatland and Chugwater are expected to increase in population during the 1983 to 1992 analysis period, the population increases serve mainly to replace population lost after the completion of the Laramie River Station near Wheatland. As such, no substantive changes in organization, staffing, capital facilities, or capital equipment for either town's general government are likely to occur during 1983 to 1992.

3.1.6.4.7.6

Kimball County and City of Kimball  
Baseline Future - No Action Alternative

Based on stable population projections, no changes in staff, vehicles, space, or level of service delivery are projected for either Kimball County general government or the City of Kimball general government with the No Action Alternative.

3.1.6.4.7.7

Laramie County Proposed Action

Laramie County general government is projected to need additional staff in order to serve the increased population projected to result from the Proposed Action. In order to prevent degradation of service, increased staffing needs due to the Proposed Action were projected. Table 3.1.6-5 illustrates staffing needs for Laramie County general government due to the Proposed Action. There will also be a need for approximately 375 sq ft of additional space in the peak year for additional staff. No capital equipment needs for Laramie County general government due to the Proposed Action are anticipated. Based on these projected needs, the short-term impact on general government service level is considered to be moderate but not significant. In the long term, the impact is considered to be low and not significant.

3.1.6.4.7.8

City of Cheyenne Proposed Action

Based on the population increases projected for the city of Cheyenne due to the Proposed Action, Cheyenne general government, in order to maintain estimated 1983 service levels, will need to increase staffing from 1985 to 1992. Table 3.1.6-6 illustrates staffing needs due to population increases. It is also anticipated that additional general government space will be needed as a result of the Proposed Action. However, the spatial requirement is less than 500 sq ft of office space. No capital equipment needs for the City of Cheyenne general government due to the Proposed Action are projected. Based on these projections, the impact of the Proposed Action on general government service level in the City of Cheyenne is considered to be moderate but not significant in the short term and low, not significant in the long term.

3.1.6.4.7.9

Town of Pine Bluffs Proposed Action

Based on relatively low population increases due to the Proposed Action, negligible, not significant impacts on Pine Bluffs general government are projected for both short and long terms.

3.1.6.4.7.10

Platte County Proposed Action

Based on population increases of 225 persons (including weekly commuters) due to the Proposed Action in 1985, 500 persons in 1986, and 250 persons in 1987, and the fact that Platte County has experienced much larger increases in population within the past 10 years, no changes in organization or capital facilities are projected. Capital equipment and staffing for road maintenance would need to increase as detailed in the transportation analysis. Staffing

increases of one person above the No Action Alternative are projected for the 1985 through 1988 period. Consequently, impacts are projected to be moderate and not significant in the short term and negligible, not significant in the long term.

3.1.6.4.7.11      Towns of Wheatland and Chugwater  
Proposed Action

Based on population projections and the fact that both towns are staffed and equipped to serve larger populations than those resulting from the Proposed Action, general government impacts on both towns are projected to be negligible and not significant in both the short and long term.

3.1.6.4.7.12      Kimball County and City of Kimball  
Proposed Action

Population increases are projected to be low, and County and City governments have historically been able to successfully accommodate large population influxes. Therefore general government impacts due to the Proposed Action are projected to be negligible, not significant, for both Kimball County and the City of Kimball in the short and long term.

3.1.6.4.8      Libraries

3.1.6.4.8.1      Laramie County Baseline Future -  
No Action Alternative

Since no new facilities are planned for the Laramie County Library system and population is projected to increase, library space is projected to decline from 0.5 to 0.4 sq ft per capita from 1983 to 1992. This equates to an unmet demand for 5,912 sq ft of space when projected at 1982 levels. Similarly for books and staff, book needs by 1992 will total 24,800 more than in 1982 and the demand for staff will be for 7 additional persons by 1992.

3.1.6.4.8.2      Platte County Baseline Future - No  
Action Alternative

Based on maintaining 1982 levels of service and projected population increases, the Platte County Public Library system will experience book demand increases from 1,210 in 1984 to 1,350 in 1992. Demand for staff is projected to be one person in 1985, a second in 1989, and a third in 1992. Although library space is presently deficient, an existing proposal for library expansion, when funded, would alleviate this problem. If not constructed, space needs would continue to deteriorate.

3.1.6.4.8.3      City of Kimball Baseline Future -  
No Action Alternative

With stable population projected for Kimball County and the city of Kimball, service levels are expected to remain steady for the users of the Kimball Public Library during 1983 to 1992 with the No Action Alternative.

3.1.6.4.8.4      Laramie County Proposed Action

Increased demands on what are projected to be inadequate service levels for the Laramie County Library system will result from the Proposed Action. During 1987, the peak year of population increase in the county (if no additions to books and staff are made), increased demand will cause service levels to decline from 1982 levels of 1.7 books per capita and 1 staff

person (full time) per 2,025 population to 1.5 books per capita and 1 staff to 2,276 population. If services are augmented, project-related demand is equivalent to approximately 1.3 additional full-time equivalent staff. At Wyoming State Library standard for books per capita, the peak year (1987) demand for additional books over baseline service demand is projected to be 5,300 books. In addition to these impacts, the Proposed Action is projected to result in increased demand for space or a further reduction in the per capita level of space provided over the baseline reduction, as well as disproportionate increases in lost books and demands on staff time due to the projected influx of transients. Based on these projections, impacts on the Laramie County Library system are considered to be moderate and not significant in the short term and low, not significant in the long term.

#### 3.1.6.4.8.5 Platte County Proposed Action

Based on population increases projected to occur in Platte County in 1985, 1986, and 1987, according to Wyoming State Library standards, additional books and staff time will be required to prevent degradation of service levels. In 1986, the peak impact year, 2,630 additional books over baseline demand would be required along with some additional staff time (less than one-half full-time equivalent). Although the level of space provision would be temporarily degraded, no additional space would be necessary. Impacts are projected to be low and not significant in the short term and negligible, not significant in the long term.

#### 3.1.6.4.8.6 City of Kimball Proposed Action

With small population increases projected under the Proposed Action in Kimball County and the city of Kimball for 1987 to 1989, the projected increases in the service levels with No Action are altered for this 3-year period, but return to projected baseline levels in 1990. Impacts on the Kimball Public Library and its users are considered to be negligible, not significant in the short and long terms.

#### 3.1.6.4.9 Consideration of Alternatives

No changes in population immigration are projected for alternative dispatch stations, onbase roads, or cable routings. Therefore, no differences in impacts on public services are projected, since the public services impacts are based on population changes.

#### 3.1.6.5 Summary of Impacts

##### 3.1.6.5.1 Explanation of Detailed Impact Matrix

As Figure 3.1.6-2 illustrates, the highest significant impacts are projected for Laramie County School District No. 1. All other impacts are moderate or lower.

Public services analysis indicates a high, short-term, significant impact on education in Laramie County School District No. 1 due to increased enrollments for all elementary and secondary grade levels from 1985 through 1990. Laramie County School District No. 2 is projected to experience moderate and significant long-term impacts due to the need for additional staffing and controversy due to exacerbation of currently crowded school conditions.

Impacts on law enforcement in Laramie County and the city of Cheyenne are projected to be moderate in the short term due to the need for an increase in staffing, and significant because of potential disproportional increases in demand for law enforcement services and the controversy from potential demonstrations.



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LEGEND		ADVERSE IMPACTS	SIGNIFICANT ADVERSE IMPACTS	PROJECT IMPACTS					
LEVEL OF IMPACT *	LOW	○	●	SHORT TERM			LONG TERM		
	MODERATE	○	●	SITE	LOCAL	REGIONAL	SITE	LOCAL	REGIONAL
HIGH	○	●							
POTENTIAL BENEFICIAL EFFECTS									
* MEASURE OF THE AMOUNT OF ENVIRONMENTAL CHANGE									
PUBLIC SERVICES AND FACILITIES					●			○	
Education					●			○	
Laramie County School District #1					●			○	
Laramie County School District #2					●				
Platte County School District #1					○				
Kimball County School System					○				
Law Enforcement					●			○	
Laramie County					●			○	
City of Cheyenne					●			○	
Town of Pine Bluffs									
Platte County									
Town of Wheatland					○				
Town of Chugwater									
Kimball County									
City of Kimball					○				

FIGURE 3.1.6-2 PUBLIC SERVICES AND FACILITIES  
SUMMARY IMPACT MATRIX

LEGEND

ADVERSE IMPACTS

SIGNIFICANT ADVERSE IMPACTS

LEVEL OF IMPACT \*

LOW

MODERATE

HIGH

○

○

○

●

●

●

POTENTIAL BENEFICIAL EFFECTS

★ MEASURE OF THE AMOUNT OF ENVIRONMENTAL CHANGE

PROJECT IMPACTS

SHORT TERM

LONG TERM

SITE

LOCAL

REGIONAL

SITE

LOCAL

REGIONAL


Justice System		○				
Laramie County		○				
City of Cheyenne		○				
Town of Pine Bluffs						
Platte County		○				
Town of Wheatland						
Town of Chugwater						
Kimball County		○				
Fire Protection		○			○	
Laramie County Fire District #1		○				
Laramie County Fire District #2		○				
Laramie County Fire District #5						
F.E. Warren AFB						
City of Cheyenne		○			○	
Platte County Fire District #1F/Wheatland						
Platte County Fire Zone #3/Chugwater						
Kimball Rural Fire District/City of Kimball						

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FIGURE 3.1.6-2 Continued

PUBLIC SERVICES AND FACILITIES  
SUMMARY IMPACT MATRIX

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LEGEND		ADVERSE IMPACTS	SIGNIFICANT ADVERSE IMPACTS		
LEVEL OF IMPACT ★	LOW	○	●		
	MODERATE	○	●		
	HIGH	○	●		
POTENTIAL BENEFICIAL EFFECTS					
★ MEASURE OF THE AMOUNT OF ENVIRONMENTAL CHANGE					

PROJECT IMPACTS					
SHORT TERM			LONG TERM		
SITE	LOCAL	REGIONAL	SITE	LOCAL	REGIONAL
Health Care	○				
Laramie County	●				
Platte County					
Kimball County					
Human Services	●				
Laramie County	●				
Alcohol Receiving Center/ Cheyenne Halfway House	●				
New Morning Awareness House	○				
Alcohol Traffic Safety	○				
Pathfinder	○				
Project Hope	○				
F.E. Warren AFB Social Action	○				
DPASS	○				
Community Center on Domestic Violence	○				
YWCA Rape Crisis Center	○				
Cottonwood Y	○				
COME A Shelter	●				
Salvation Army	●				
Community Action	○				

FIGURE 3.1.6-2 Continued

PUBLIC SERVICES AND FACILITIES  
SUMMARY IMPACT MATRIX

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LEGEND		ADVERSE IMPACTS	SIGNIFICANT ADVERSE IMPACTS	PROJECT IMPACTS					
LEVEL OF IMPACT ★	LOW	○	●	SHORT TERM			LONG TERM		
	MODERATE	○	●	SITE	LOCAL	REGIONAL	SITE	LOCAL	REGIONAL
	HIGH	○	●						
POTENTIAL BENEFICIAL EFFECTS									
★ MEASURE OF THE AMOUNT OF ENVIRONMENTAL CHANGE									

Human Services (continued)						
Solar Greenhouse		○				
Food Clearinghouse		○				
Interagency Board		○				
Youth Alternatives		○				
Attention Home		○				
Mental Health Center		●				
F.E. Warren AFB Mental Health Clinic		○				
Cheyenne Housing Authority						
Day Care Centers						
Stride Learning Center		○				
Platte County		○				
DPASS		○				
Mental Health Center						
Kimball County		○				
Community Action		○				
Panhandle Mental Health		○				
Dept. of Social Services		○				
Head Start						

FIGURE 3.1.6-2 Continued

PUBLIC SERVICES AND FACILITIES  
SUMMARY IMPACT MATRIX

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LEGEND		ADVERSE IMPACTS	SIGNIFICANT ADVERSE IMPACTS	PROJECT IMPACTS						
LEVEL OF IMPACT *	LOW	○	●	SHORT TERM			LONG TERM			
	MODERATE	○	●	SITE	LOCAL	REGIONAL	SITE	LOCAL	REGIONAL	
	HIGH	○	●							
POTENTIAL BENEFICIAL EFFECTS										
* MEASURE OF THE AMOUNT OF ENVIRONMENTAL CHANGE										
General Government					○					
Laramie County					○			○		
City of Cheyenne					○			○		
Town of Pine Bluffs										
Platte County					○					
Town of Wheatland										
Town of Chugwater										
Kimball County										
City of Kimball										
Libraries					○					
Laramie County					○			○		
Platte County					○					
City of Kimball										

FIGURE 3.1.6-2 Continued

PUBLIC SERVICES AND FACILITIES  
SUMMARY IMPACT MATRIX

Moderate, short-term, not significant impacts are indicated for fire protection in the city of Cheyenne and Fire Districts No. 1 and 2 due to the need for additional firefighters and vehicles. General government and library impacts are projected to be moderate because of additional staffing requirements, but not significant. Health care impacts are low and not significant in that the immigrant population can be absorbed with the existing local and regional health care and services system. Overall justice system short-term impacts are also low although Laramie County Court impacts are moderate.

Impacts on the human services element are rated moderate and significant in Laramie County. Many of the human service agencies are expected to receive low impacts. However, these agencies with the largest number of clients, Southeast Wyoming Mental Health Clinic, Alcohol Receiving Center/Halfway House, COMEA shelter, and the Salvation Army, are all projected to receive moderate, significant impacts. The majority of the remaining agencies are operating at capacity and an unmet, but unmeasured, demand is known to exist. This unmet need will most likely exist in the future under baseline future conditions. Because the current level of demand is not known, the future demand can be neither measured nor projected. This situation represents an issue regarding the degradation of social well-being in the area. Consequently, these other moderate and low impacts must be examined within the context of both public services and social well-being, an element of the socioeconomics resource. Therefore, human service agencies operating at capacity which cannot expand institutionally in response to increases in demand may be indicative of a need for additional support for human services in the community.

Moderate, not significant, short-term impacts are projected for Platte County School District No. 1 due to needs for additional staff during 1985 through 1987. Impacts on law enforcement in Platte County are restricted to a short-term, moderate but not significant impact in the Town of Wheatland, due to the need for one additional sworn officer in 1986. The justice system in the County will require the equivalent of one additional full-time staff, and the need for additional courtroom space will be accelerated by one year over the baseline space need. Therefore, justice system impacts are rated low and not significant in the short term. A moderate, not significant, short-term impact is projected for human services in Platte County due to the need for additional staff for the County office of the Department of Public Assistance and Social Services. Platte County general government impacts are determined to be moderate and not significant in the short term. Project impacts on the Platte County public library system are low but not significant in the short term.

Project impacts on the Kimball County school system are moderate and not significant in the short term because six additional classroom teachers and one additional school bus will be required for the incremental student enrollment projected under the Proposed Action. Low, not significant impacts on Kimball County human services are projected based on the need for additional staff at the Department of Social Services in 1989 the peak year of project immigration.

#### 3.1.6.5.2 Aggregation of Elements, Impacts, and Significance

The overall level of impact on public services and facilities is locally moderate and significant in the short term and locally moderate and not significant in the long term. Determination of the overall impact rating for public services and facilities involved aggregation of the impact ratings for the elements and subelements of the resource. Subelements were derived either on a jurisdictional basis or on an organization basis. For each element (as described in Section 2.1.6), the counties of Laramie, Platte, and Kimball, and the cities of Cheyenne, Pine Bluffs, Wheatland, Chugwater, and Kimball were utilized. In addition to a jurisdictional breakdown, human services were further evaluated on a service organization basis. The subelements were aggregated to the element level for impacts and significance through the qualitative

consideration of five primary factors. These are the size of the jurisdictions in relation to each other, the magnitude of the impacts, the proportion of the impact population to the total population, whether the impact warranted further attention by identification of significance (as described in Section 3.1.6.3), and the number of clientele each agency serves. The human services organizations were aggregated to the jurisdictional and element level by the magnitude of impacts associated with the project.

### 3.1.6.6 Mitigation Measures

Potential mitigation measures that will be considered are identified below. One, some, or all of the mitigation measures may ultimately be selected. Each measure identifies the implementing agency, but not necessarily the funding agency.

#### 3.1.6.6.1 Education

The following mitigation measures for impacts on education are presented for consideration:

##### 3.1.6.6.1.1 Laramie County School District No. 1

- o The redefinition of grades 6-8 as middle schools and grades 9-12 as high schools would require the construction of a new high school, and would be effective in relieving the elementary school space shortage. This mitigation measure, if selected, should be implemented by the fall of 1986 or the fall of 1987. The responsible agency for this mitigation measure would be Laramie County School District No. 1.
- o The building of a new elementary school to provide a facility for the projected 330 elementary students in 1987. This mitigation measure will be effective in providing the extra classroom space needed for the elementary students, and if selected, should be implemented by August 1987. The responsible agency for implementing this mitigation measure is the Laramie County School District No. 1.
- o The hiring of additional staff beginning in the fall of 1984 with 7 and peaking in the fall of 1987 with 58. Of the 58, 33 are classroom teachers, 8 are other certified, and 17 are noncertified staff. This mitigation measure will be effective in providing students the quality of education similar to 1982 standards. The responsible agency for implementing this measure is Laramie County School District No. 1.
- o The purchase of five additional school buses beginning with one in the fall of 1984 and peaking with five in the fall of 1987. This mitigation measure would be effective in providing transportation to distribute enrollments by cluster more evenly. The responsible agency for implementing this mitigation measure is Laramie County School District No. 1.
- o The purchase or leasing of modular units to increase available space, not necessarily to be used as classrooms, but rather as offices or special program space. This mitigation measure will be effective in providing extra classroom space by freeing up existing space, and if selected should be implemented by the fall of 1985. The responsible agency for implementing this mitigation measure is Laramie County School District No. 1.

- o The remodeling of existing facilities to increase space, such as the two floors at Churchill Elementary School. This mitigation measure would be effective in easing classroom space needs and, if selected, should be implemented by the fall of 1985. The responsible agency for implementing this mitigation measure is Laramie County School District No. 1.
- o Subsidization of educational expenses of some of the projected impact students to enable them to attend nonpublic schools. This mitigation measure would encourage enrollments in nonpublic schools, which have excess capacity and relieve some of the crowding in the public schools. This mitigation measure, if selected, should be operational by fall of 1984. The responsible agency for implementing this mitigation measure would be the Assembly and Checkout contractor.
- o The redefining of the cluster boundaries to promote a more even distribution of enrollments among the schools. This mitigation measure would be effective in relieving the crowding in some elementary schools and, if selected, should be implemented by the fall of 1984. The responsible agency for implementing this mitigation measure is Laramie County School District No. 1.
- o Busing the students who live on F.E. Warren AFB to other schools that are less crowded than the ones to which they are currently bused. This mitigation measure would be effective to distribute the enrollments among schools more evenly. It is preferable to bus these students because they currently do not attend schools in their own neighborhoods. This mitigation measure, if selected, should be implemented by fall of 1984. The responsible agency for this mitigation measure is Laramie County School District No. 1.
- o The incorporation into the high school curriculum of a service requirement (for credit) that would involve the students in volunteer work in the community or at school. Students could fulfill this requirement one day a week and the schedules could be staggered. This mitigation measure would be effective in assisting the social service agencies and schools with volunteer staffing; providing students with valuable experience; and relieving crowding in the high schools. This mitigation, if selected, would be gradually implemented, but planning should begin as soon as possible. The responsible agency for implementing this mitigation measure is Laramie County School District No. 1.
- o The incorporation into the curriculum of a study unit on issues associated with the Proposed Action. This mitigation measure would be effective in giving the students better understanding of the issues associated with the project and help to relieve any anxieties they may have about the nuclear age. This mitigation measure, if selected, should be ready for fall of 1984. The responsible agency for this mitigation measure is Laramie County School District No. 1.
- o Adopting different scheduling in the high schools such as using the first period in the day by providing busing earlier in the morning. This mitigation measure would relieve some of the anticipated crowding and, if selected, should be implemented by fall 1985. The responsible agency for this mitigation measure would be Laramie County School District No. 1.
- o Exchanging with the City or County Old Johnson Junior High School for a desirable piece of property. The site would be used to locate a new school building. This mitigation measure would be effective in relieving the School District of Old



Johnson Junior High (which is not being used, but is being maintained), and solving the problem of buying land for a new building. This mitigation measure, if selected, should be implemented as soon as possible. The responsible agencies for implementing this mitigation measure would be the City of Cheyenne, Laramie County, and Laramie County School District No. 1.

- o The use of the School Assistance in Federally Affected Areas-Construction Program (Impact Aid/Disaster Aid). Assistance in the form of project grants is available for the construction or equipping of urgently needed school facilities in school districts which have had substantial increases in school membership as a result of new or increased federal activities. Local educational agencies which provide free public elementary or secondary education in federally impacted areas are eligible for this type of assistance. This mitigation measure would be effective in easing the monetary burdens that the District faces as a result of the impact enrollments. This mitigation measure, if selected, should be implemented before the projected peak enrollments of 1987. The responsible agencies for this mitigation measure are Laramie County School District No. 1 and the U.S. Department of Education.
- o The use of the School Assistance in Federally Affected Areas-Maintenance and Operation Program (Impact Aid/Disaster Aid). Assistance grants are available to provide financial support to local educational agencies affected by sudden and substantial increased school attendance. Funds may be used for maintenance and operation expenditures. Eligible applicants are local educational agencies which provide free public elementary or secondary education (U.S. Department of Education). This mitigation measure would be effective in easing the monetary burdens that the District faces with the impact enrollments. This mitigation measure, if selected, should be implemented before the projected peak enrollments of 1987. The responsible agencies for this mitigation measure are Laramie County School District No. 1 and the U.S. Department of Education.
- o The promotion of the use of vans or car pools to transport students. This mitigation measure would be effective in alleviating the needs for additional buses. This mitigation measure, if selected, should be implemented before fall of 1987. The responsible agency for this mitigation measure would be Laramie County School District No. 1.
- o The regrouping of elementary grades such as K-3 and grades 4-6 by building. This mitigation measure would be effective in alleviating some of the crowded conditions, and, if selected, should be implemented by fall 1984. The responsible agency for implementing this mitigation measure is Laramie County School District No. 1.
- o The hiring of part-time staff members to assist in processing, counseling, and orienting new students. This "welcome wagon" mitigation would be effective in alleviating the commitment of the full-time noncertified staff, and assist the new students, especially in the elementary grades, in their adjustment. This mitigation measure, if selected, should be implemented by fall 1984. The responsible agency for this mitigation measure is Laramie County School District No. 1.
- o The leasing of garage space to house the additional buses. Housing the buses would prevent vandalism and reduce cold weather start-up costs. This mitigation measure, if selected, should be implemented by fall 1984. The responsible agency for this mitigation measure is Laramie County School District No. 1.

- o The purchase of a mobile unit equipped with computers to be driven from elementary school to school. This mitigation measure would be effective in responding to the current requests for computers and computer rooms in times of crowded buildings and tight budgets. This mitigation measure, if selected, should be implemented as soon as possible. The responsible agency for implementing this mitigation measure would be Laramie County School District No. 1.
- o Developing a mechanism to provide additional financial resources to schools that experience unanticipated impacts. This mitigation measure would be effective in alleviating those additional impacts that may occur to specific schools that may not have been planned prior to project construction. If selected, this fund should be established in 1984 prior to project-related enrollments. The responsible agency for implementing this mitigation is Laramie County School District No. 1.
- o Institute a monitoring program to allow determination of those schools whose capacity has been exceeded by the impact enrollment as well as those unmet needs that, if left unmet, will lead to problems among the staff and other students. This mitigation measure, if selected, should be implemented in early 1984 to allow the School District to better coordinate its impact planning efforts. While monitoring itself will not reduce the level of impact or significance, it will allow Laramie County School District No. 1 to be more efficient in its handling of these impacts. The responsible agency for implementing this mitigation measure is Laramie County School District No. 1.

#### 3.1.6.6.1.2 Laramie County School District No. 2

- o The hiring of eight additional staff members in 1988. This mitigation measure would be effective in providing the quality of education to students similar to 1982 standards. The responsible agency for implementing this mitigation measure is Laramie County School District No. 2.
- o Developing a mechanism to provide additional financial resources to schools that experience unanticipated impacts. This mitigation measure would be effective in alleviating those additional impacts that may occur to specific schools that may not have been planned prior to project construction. If selected, this fund should be established in 1988 prior to project-related enrollments. The responsible agency for implementing this mitigation is Laramie County School District No. 2.
- o Institute a monitoring program to allow determination of those schools whose capacities have been exceeded by the impact enrollment as well as those unmet needs that, if left unmet, will lead to problems among the staff and other students. This mitigation measure, if selected, should be implemented in early 1988 to allow the School District to better coordinate its impact planning efforts. While monitoring itself will not reduce the level of impact or significance, it will allow Laramie County School District No. 2 to be more efficient in its handling of these impacts. The responsible agency for implementing this mitigation measure is Laramie County School District No. 2.

#### 3.1.6.6.1.3 Platte County School District No. 1

- o The hiring of 3 additional staff members for fall 1985 and 12 more in fall of 1986. This mitigation measure would be effective in providing students the quality of education similar to 1982 standards. The responsible agency for implementing this mitigation measure is Platte County School District No. 1.

- o Developing a mechanism to provide additional financial resources to schools that experience unanticipated impacts. This mitigation measure would be effective in alleviating those additional impacts that may occur to specific schools that may not have been planned prior to project construction. If selected, this fund should be established in 1985 prior to project-related enrollments. The responsible agency for implementing this mitigation is Platte County School District No. 1.
- o Institute a monitoring program to allow determination of those schools whose capacities have been exceeded by the impact enrollment as well as those unmet needs that, if left unmet, will lead to problems among the staff and other students. This mitigation measure, if selected, should be implemented in early 1985 to allow the School District to better coordinate its impact planning efforts. While monitoring itself will not reduce the level of impact or significance, it will allow Platte County School District No. 1 to be more efficient in its handling of these impacts. The responsible agency for implementing this mitigation measure is Platte County School District No. 1.

#### 3.1.6.6.1.4 Kimball County School System

- o The hiring of 2 additional teachers in the fall of 1988 and 4 more in the fall of 1989. This mitigation measure would be effective in providing students the quality of education similar to 1982 standards. The responsible agency for implementing this mitigation measure is the Kimball County School system.
- o Developing a mechanism to provide additional financial resources to schools that experience unanticipated impacts. This mitigation measure would be effective in alleviating those additional impacts that may occur to specific schools that may not have been planned prior to project construction. If selected this fund should be established in 1988 prior to project-related enrollments. The responsible agency for implementing this mitigation is the Kimball County School system.
- o Institute a monitoring program to allow determination of those schools whose capacities have been exceeded by the impact enrollment as well as those unmet needs that, if left unmet, will lead to problems among the staff and other students. This mitigation measure, if selected, should be implemented in early 1988 to allow the School District to better coordinate its impact planning efforts. While monitoring itself will not reduce the level of impact or significance, it will allow the Kimball County School system to be more efficient in its handling of these impacts. The responsible agency for implementing this mitigation measure is the Kimball County School system.

#### 3.1.6.6.2 Law Enforcement

The following mitigation measures for impacts on law enforcement are presented for consideration:

##### 3.1.6.6.2.1 Laramie County Sheriff's Department

- o Provision of the staff and equipment necessary to maintain existing service levels. This mitigation measure will be effective in the provision of law enforcement services in Laramie County at existing service levels and, if selected, should be implemented in 1984 by the Sheriff's Department.

- o Establishment of a monitoring program within both the Laramie County Sheriff's Department and the Cheyenne Police Department to measure month-to-month changes in demand on those agencies taking into account regular seasonal variations. From this program, any disproportionate increases in demand, as measured by an index such as total calls for service, could be identified. The program should be implemented in early 1984 by local law enforcement agencies. While monitoring itself will not reduce levels of impact or significance, it will allow the County to be more efficient in its handling of those impacts.
- o Establishment of a mechanism to alleviate disproportionate increases in law enforcement agency needs identified in the monitoring program. Such disproportionate increases would include costs of civil demonstrations. This mitigation measure will be effective in permitting the Department to increase existing levels of service if necessary in the future and, if selected, should be implemented in 1984 by Laramie County.
- o Development and implementation of a brief, direct educational/ informational program for project employees in close cooperation with project contractors to inform the employees about laws and law enforcement practices in the various jurisdictions. This measure should be implemented in 1984 by the Sheriff's Department and should be effective in reducing the incidence of offenses.
- o Coordination with the courts in scheduling cases in a manner that reduces the time spent in court appearances by law enforcement personnel. This measure should be implemented jointly by the Sheriff's Department and the various courts on an ongoing basis starting in 1984. This measure will be effective in reducing the amount of time officers have to spend in court, freeing them for other duties and possibly reducing the need for additional future personnel.
- o Increased crime prevention activities through additional time spent by Department personnel in programs aimed at individual, residential, and commercial targets. This measure should be implemented on an ongoing basis starting in 1984 by the Sheriff's Department and will be effective in reducing the number of offenses. These increased activities could be conducted by impact-related personnel.
- o Increased patrols of parks on an ongoing basis starting in 1984. This measure should be implemented by the Sheriff's Department and will be effective in ensuring the proper use of such facilities by transients and others. These patrols could be conducted by impact-related personnel.
- o Within legal limits and the discretion of the officer involved, increased use of summonses and corresponding decreased use of arrests where possible to reduce time spent by both law enforcement and court personnel. This measure should be implemented on an ongoing basis starting in 1984 by the Sheriff's Department and would be effective in reducing the time spent by officers on certain individual cases, freeing them for other duties.
- o Because of the unknowns surrounding possible demonstrations and the inappropriateness of additional permanent personnel to deal with them, the proposed contingency fund could be utilized to mitigate potential impacts on local law enforcement agencies due to potential demonstrations. Creation of the fund is

the responsibility of Laramie County and should be implemented in 1984. This fund would be effective in providing the funds necessary to cover Departmental expenses relating to demonstrations.

- o Provision to local law enforcement agencies of special training in crowd control and other techniques related to civil demonstrations. This measure should be implemented by the County and City departments in 1984, and will assist the departments in dealing with civil demonstrations.
- o Seminars with law enforcement officials from other jurisdictions who have had experience with such projects and who would share with local law enforcement officials the benefits of that experience. This measure should be implemented in 1984 jointly by local law enforcement agencies and will be effective in assisting these agencies in dealing with project-related impacts.
- o Prior to completion of the proposed city/county law enforcement center, overcrowded conditions will be exacerbated due to both baseline and project-related needs in the Cheyenne Police Department and the Laramie County Sheriff's Department. For the Police Department, it may be possible to locate the additional employees in the existing structure, though this will decrease the per employee square footage from an already marginal 133 to 106 sq ft per employee. For the Sheriff's Department, and very possibly for the Police Department as well, it may be necessary to lease additional space in the area of the existing facility to meet needs under the Proposed Action as well as baseline needs. It would be necessary for Department officials to review internal operations and identify those discrete activities which would be least affected if physically separated from the remainder of the Department, and to relocate selected functions into temporarily leased space pending completion of the proposed law enforcement center.

#### 3.1.6.6.2.2

#### Cheyenne Police Department

- o Provision of the staff and equipment necessary to maintain existing service levels. This mitigation measure will be effective in the provision of law enforcement services in Cheyenne at existing service levels and, if selected, should be implemented in 1984 by the City of Cheyenne.
- o Establishment of a monitoring program within both the Laramie County Sheriff's Department and the Cheyenne Police Department to measure month-to-month changes in demand on those agencies taking into account regular seasonal variations. From this program, any disproportionate increases in demand, as measured by an index such as total calls for service, could be identified. The program should be implemented in early 1984 by local law enforcement agencies. Instituting this mitigation will allow the community to better coordinate its impact planning efforts and to better utilize funding for impact mitigation purposes. While monitoring itself will not reduce levels of impact or significance, it will allow the community to be more efficient in its handling of those impacts.
- o Establishment of a mechanism with which to alleviate disproportionate increases in law enforcement agency needs identified in the monitoring program. Such disproportionate increases would include costs of civil demonstrations. This mitigation measure will be effective in permitting the Department to increase existing levels of service if necessary in the future and, if selected, should be implemented in 1984 by the City of Cheyenne.

- o Development and implementation of a brief, direct educational/ informational program for project employees in close cooperation with project contractors to inform the employees about laws and law enforcement practices in the various jurisdictions. This measure should be implemented in 1984 by the Police Department and should be effective in reducing the incidence of offenses.
- o Coordination with the courts in scheduling cases in a manner that reduces the time spent in court appearances by law enforcement personnel. This measure should be implemented jointly by the Police Department and the various courts on an ongoing basis starting in 1984. This measure will be effective in reducing the amount of time officers have to spend in court, freeing them for other duties and possibly reducing the need for additional future personnel.
- o Increased crime prevention activities through additional time spent by Department personnel in programs aimed at individual, residential, and commercial targets. This measure should be implemented on an ongoing basis starting in 1984 by the Police Department and will be effective in reducing the number of offenses. These increased activities could be conducted by impact-related personnel.
- o Increased patrols of parks on an ongoing basis starting in 1984. This measure should be implemented by the Police Department and will be effective in ensuring the proper use of such facilities by transients and others. These patrols could be conducted by impact-related personnel.
- o Within legal limits and the discretion of the officer involved, increased use of summonses and corresponding decreased use of arrests where possible to reduce time spent by both law enforcement and court personnel. This measure should be implemented on an ongoing basis starting in 1984 by the Police Department and would be effective in reducing the time spent by officers on certain individual cases, freeing them for other duties.
- o Because of the unknowns surrounding possible demonstrations and the inappropriateness of adding permanent personnel to deal with them, the proposed contingency fund could be utilized to mitigate the impacts on local law enforcement agencies due to potential demonstrations. Creation of the fund is the responsibility of the City of Cheyenne and should be implemented in 1984. This fund would be effective in providing the funds necessary to cover Departmental expenses relating to demonstrations.
- o Provision to local law enforcement agencies of special training in crowd control and other techniques related to civil demonstrations. This measure should be implemented in 1984 and will assist the Department in dealing with civil demonstrations.
- o Seminars with local law enforcement officials from other jurisdictions who have had experience with such projects and who would share with local law enforcement officials the benefits of that experience. This measure should be implemented in 1984 jointly by local law enforcement agencies and will be effective in assisting local law enforcement agencies in dealing with project-related impacts.

- o Prior to completion of the proposed city/county law enforcement center overcrowded conditions will be exacerbated due to both baseline and project-related needs in the Cheyenne Police Department and the Laramie County Sheriff's Department. For the Police Department, it may be possible to locate the additional employees in the existing structure. However, this will decrease the per employee square footage from an already marginal 133 to 106 sq ft per employee. For the Sheriff's Department, and very possibly for the Police Department as well, it may be necessary to lease additional space in the area of the existing facility to meet needs under the Proposed Action as well as baseline needs. Department officials could review internal operations and identify those discrete activities which would be least affected if physically separated from the remainder of the Department. Those functions could be relocated into temporarily leased space pending completion of the proposed law enforcement center.

#### 3.1.6.6.2.3 Wheatland Police Department

- o Provision by the Town of Wheatland of 1 additional sworn officer for 1 year. This mitigation measure will be effective in maintaining existing service levels and, if selected, should be implemented in 1986.

#### 3.1.6.6.2.4 City of Kimball

- o Provision by the City of Kimball of 1 additional sworn officer for 1 year. This mitigation measure will be effective in maintaining existing service levels and, if selected, should be implemented in 1989.

#### 3.1.6.6.3 Justice System

The following mitigation measures for impacts on the justice system are presented for consideration:

##### 3.1.6.6.3.1 Laramie County

- o Revising certain rules of civil procedure. Rules similar to the new Federal Rules of Civil Procedure 7, 11, 16, and 26 may be adopted. These new rules create additional duties for attorneys concerning the amount and types of pretrial discovery and conferences that are permitted. In addition, the rules provide new and stronger sanctions against attorneys and/or parties if their duties are breached. This mitigation measure would be effective in promoting pretrial settlements as well as defining more sharply the issues at trial, hence reducing civil caseloads. The Supreme Court of Wyoming, the Wyoming Legislature, and the private bar would be responsible for implementing this mitigation, which should be implemented as soon as possible.
- o Increase docket fees and fines. Since studies have shown that docket fees reimburse the courts for only a small fraction of the total cost incurred by the court in handling a case, docket fees could be increased and part or all of the monies collected be earmarked for the court. The same approach could be used (within due process limitations) in increasing criminal fines levied against defendants found guilty. This mitigation measure would be effective in providing an adequate court operating budget and, if selected, should be implemented as soon as possible. The Court, the legislature, and the Wyoming Supreme Court would be responsible for implementing this mitigation measure.

- o **Encourage arbitration.** Arbitration, mediation, and other alternative forms of dispute resolution could be encouraged through education of Court personnel, the private bar, and potential litigants, and by amendment of the arbitration statute. This mitigation measure would be effective in reducing civil caseloads and, if selected, should be implemented as soon as possible. The legislature, the Wyoming Supreme Court, the private bar, and potential litigants would be responsible for this mitigation.
- o **Increase computerization of Court files.** This mitigation would be effective in alleviating Court file storage problems as well as in increasing the efficiency of Court operation (especially as to minor traffic offenses) and, if selected, should be implemented as soon as possible. The Court, the County, the Wyoming Supreme Court, and the legislature would be responsible for implementing this mitigation.
- o **Implement specialization of personnel.** Certain personnel could be assigned to particular tasks or type of cases. This would be effective in increasing the efficiency of Court operation and, if selected, should be implemented as soon as possible. The Court and the County would be responsible for implementing this mitigation.
- o **Offer law student internships.** Law student internships in return for either law school credit or a small stipend could be offered. This would be effective in reducing the amount of time spent by the judge on legal research and opinion and order writing and, if selected, should be implemented as soon as possible. The Court and the University of Wyoming School of Law would be responsible for implementing this mitigation.
- o **Public education on traffic laws and safety.** This mitigation measure would be effective in reducing the number of traffic cases and, if selected, should be implemented as soon as possible. The Court and the local law enforcement agencies would be responsible for implementing this mitigation.
- o **Encourage issuance of summonses.** The issuance of summonses in lieu of arrest when the defendant does not represent a danger to himself or others should be encouraged. This would be effective in reducing the amount of time spent on a case by the judge and support staff and, if selected, should be implemented as soon as possible. The law enforcement agencies would be responsible for implementing this mitigation.
- o **Increase courtroom and office space.** The Laramie County Court will need increased courtroom and corresponding office space under baseline conditions. Impact conditions will contribute to this need. This mitigation will be effective in keeping service levels from degrading and to increase efficiency in courtroom operation. There are three alternatives to provide more space for the Court. First, the bottom floor of the courthouse could be remodeled to provide a new courtroom and corresponding office space. Second, the Court could be housed in the planned new city-county justice center. Finally, the Court could hold sessions at night; however, there are limitations as to the usefulness of night court and it should probably be used only as an interim measure. The planning for this mitigation, if selected, should begin as soon as possible. The Court and the County would be responsible for implementing this mitigation.



- o **Increase staff.** The Laramie County Court will need increased staff under baseline conditions. Impact conditions will contribute to this need. This mitigation will be effective in keeping service levels from degrading. The Court and the County are responsible for implementing this mitigation.

#### 3.1.6.6.3.2 City of Cheyenne

- o **Increase computerization of Court files.** This mitigation would be effective in alleviating any Court file storage problems as well as in increasing the efficiency of Court operation (especially as to minor traffic offenses) and, if selected, should be implemented as soon as possible. The Court, the City, the Wyoming Supreme Court, and the legislature would be responsible for implementing this mitigation.
- o **Implement specialization of personnel.** Certain personnel could be assigned to particular tasks or type of cases. This would be effective in increasing the efficiency of Court operation and, if selected, should be implemented as soon as possible. The Court and the city would be responsible for implementing this mitigation.
- o **Offer law student internships.** Law student internships in return for either law school credit or a small stipend could be offered. This would be effective in reducing the amount of time spent by the judge on legal research and opinion and order writing and, if selected, should be implemented as soon as possible. The Court and the University of Wyoming School of Law would be responsible for implementing this mitigation.
- o **Public education on traffic laws and safety.** This mitigation measure would be effective in reducing the number of traffic cases and, if selected, should be implemented as soon as possible. The Court and the local law enforcement agencies would be responsible for implementing this mitigation.
- o **Encourage issuance of summonses.** The issuance of summonses in lieu of arrest when the defendant does not represent a danger to himself or others should be encouraged. This would be effective in reducing the amount of time spent on a case by the judge and support staff and, if selected, should be implemented as soon as possible. The law enforcement agencies would be responsible for implementing this mitigation.
- o **Increase staff.** The Cheyenne Municipal Court and City Attorney's office will need increased staff under baseline conditions. Impact conditions will contribute to this need. This mitigation will be effective in keeping service levels from degrading. The Court and the City are responsible for implementing this mitigation.

#### 3.1.6.6.3.3 Laramie County District Court

- o **Revising certain rules of civil procedure.** Rules similar to the new Federal Rules of Civil Procedure 7, 11, 16, and 26 may be adopted. These new rules create additional duties for attorneys concerning the amount and types of pretrial discovery permitted and pretrial conference. In addition, the rules provide new and stronger sanctions against attorneys and/or parties if their duties are breached. This mitigation measure would be effective in promoting pretrial settlements as well as defining more sharply the issues at trial, hence reducing civil caseloads.

The Supreme Court of Wyoming, the Wyoming Legislature, and the private bar would be responsible for implementing this mitigation and this mitigation should be implemented as soon as possible.

- o Increase docket fees and fines. Since studies have shown that docket fees reimburse the courts for only a small fraction of the total cost incurred by the court in handling a case, docket fees could be increased and part or all of the monies collected be earmarked for the court. The same approach could be used (within due process limitations) in increasing criminal fines levied against defendants found guilty. This mitigation measure would be effective in providing an adequate Court operating budget and, if selected, should be implemented as soon as possible. The Court, the legislature, and the Wyoming Supreme Court would be responsible for implementing this mitigation measure.
- o Encourage arbitration. Arbitration, mediation, and other alternative forms of dispute resolution could be encouraged through education of Court personnel, the private bar, and potential litigants and amendment of the arbitration statute. This mitigation measure would be effective in reducing civil caseloads and, if selected, should be implemented as soon as possible. The legislature, the Wyoming Supreme Court, the private bar, and potential litigants would be responsible for this mitigation.
- o Increase computerization of Court files. This mitigation would be effective in alleviating any Court file storage problems as well as in increasing the efficiency of Court operation and, if selected, should be implemented as soon as possible. The Court, the County, the Wyoming Supreme Court, and the legislature would be responsible for implementing this mitigation.
- o Offer law student internships. Law student internships in return for either law school credit or a small stipend could be offered. This would be effective in reducing the amount of time spent by the judge on legal research and opinion and order writing and, if selected, should be implemented as soon as possible. The Court and the University of Wyoming School of Law would be responsible for implementing this mitigation.
- o Increase staff. The Laramie County District Court, District Attorney, and Public Defender will need increased staff under baseline conditions. Impact conditions will contribute to this need. This mitigation will be effective in keeping service levels from degrading. Those organizations and the legislature are responsible for implementing this mitigation.
- o Increase courtroom space. The Laramie County District Court will need additional space. Impact conditions will contribute to this need. This mitigation will be effective in keeping service levels from degrading. The state and the county will be responsible for implementing the mitigation.

3.1.6.6.3.4      Kimball County

- o Increase docket fees and fines. Since studies have shown that docket fees reimburse the courts for only a small fraction of the total cost incurred by the court in handling a case, docket fees could be increased and part or all of the monies collected be earmarked for the court. The same approach could be used (within due process limitations) in increasing criminal fines levied against defendants found guilty. This mitigation measure would be effective in providing

an adequate Court operating budget and, if selected, should be implemented as soon as possible. The Court, the legislature, and the Wyoming Supreme Court would be responsible for implementing this mitigation measure.

- o Implement specialization of personnel. Certain personnel could be assigned to particular tasks or types of cases. This would be effective in increasing the efficiency of Court operation and, if selected, should be implemented as soon as possible. The Court and the County would be responsible for implementing this mitigation.
- o Increase computerization of Court files. This mitigation would be effective in alleviating any Court file storage problems as well as in increasing the efficiency of Court operation (especially as to minor traffic offenses) and, if selected, should be implemented as soon as possible. The Court, the County, the Nebraska Supreme Court, and the legislature would be responsible for implementing this mitigation.
- o Public education on traffic laws and safety. This mitigation measure would be effective in reducing the number of traffic cases and, if selected, should be implemented as soon as possible. The Court and the local law enforcement agencies would be responsible for implementing this mitigation.
- o Encourage issuance of summonses. The issuance of summonses in lieu of arrest when the defendant does not represent a danger to himself or others should be encouraged. This would be effective in reducing the amount of time spent on a case by the judge and support staff and, if selected, should be implemented as soon as possible. The law enforcement agencies would be responsible for implementing this mitigation.

#### 3.1.6.6.4 Fire Protection

The following mitigation measures for impacts on fire protection are presented for consideration:

##### 3.1.6.6.4.1 Laramie County Fire District No. 1

- o Provision of additional volunteers necessary to maintain existing service levels. This mitigation measure will preserve existing levels of service to District residents and, if selected, should be implemented as needed by the District.
- o The need for an additional fire truck and additional station space in which to house it will be accelerated from 1992 to 1986. This acceleration will create costs for the District. Identification of the specific costs and mitigation measures are discussed in the Fiscal Impact Analysis.

##### 3.1.6.6.4.2 Laramie County District No. 2

- o Provision of additional volunteers necessary to maintain existing service levels. This mitigation measure will preserve existing levels of service to District residents and, if selected, should be implemented as needed by the District.

3.1.6.6.4.3 City of Cheyenne

- o Provision of the appropriate staff and equipment necessary to maintain existing levels of service of the Fire Department. This mitigation measure, if selected, will be effective in maintaining existing levels of service and should be implemented in an ongoing basis starting in 1984 by the City of Cheyenne.

3.1.6.6.5 Health Care

The following mitigation measures for impacts on health care are presented for consideration:

3.1.6.6.5.1 Laramie County

- o A key factor in effective health care planning is coordination among all agencies and other providers, as established by the National Health Planning and Resources Development Act of 1974. The effectiveness and efficiency of this agency structure in Wyoming and Nebraska would be enhanced by further coordination and contact between parallel agencies in each state and among private sector health care providers. Equally important is coordination and cooperation between military health care services provided at F.E. Warren AFB and other federal installations. An Impact Coordinator's office could be set up for this purpose prior to impact (early in 1984). The need for coordination of health care services will be greatest during the construction period, because construction workers and dependents will impact existing public and private services. The responsible agency for implementing this mitigation measure is the Laramie County Health Planning Committee and all concerned political jurisdictions.

Hospital Facilities and Personnel

- o Ongoing coordination with the Laramie County Health Planning Committee and other appropriate agencies will ensure that the proper level of planning can be achieved prior to impact conditions. To expedite coordination, the full-time community coordinator located in the impact assistance office will provide updated staffing and employment information. This office would also serve as a clearinghouse for agencies to express their concerns over project effects on services. The responsible agency for implementing this measure is the County Health Planning Committee in cooperation with other health care providers.
- o Provision of comprehensive health insurance coverage for all project employees and their dependents. This mitigation measure will be effective in reducing impacts on public health services and problems associated with patients who are not able to pay for health care, and should be implemented when project contractors commence activities and hire personnel. The responsible agencies for implementing this measure are the project contractors.
- o Expansion of services at F.E. Warren AFB Hospital in a timely manner prior to immigration of project personnel. This mitigation measure will help to alleviate impacts on City and County health care facilities and personnel caused by shortfalls in services provided on base. The responsible agency for implementing this mitigation measure is the Air Force and F.E. Warren AFB Hospital administration.

### Emergency Medical Services

- o Provision of clearly marked maps to construction sites for all rural and local ambulance services. This mitigation measure will alleviate problems of access to the sites by emergency vehicles and reduce response times, and, if selected, should be implemented at the outset of construction activities. The responsible agency for implementing this measure is the Air Force.
- o Provision of emergency medical transfer capabilities at the dispatch stations, including one or more individuals with basic emergency care training. This mitigation measure would further alleviate project-related impacts on the emergency medical system, and, if selected, should be implemented as part of the dispatch station set up. The responsible agency for implementing this measure is the Air Force.

### Public Health Department

- o Relocation of the Health Unit to either one wing of the old Johnson Junior High School, or to the Police Department building located on Pioneer Avenue (as recommended by the Capital Facilities Coordination for the City of Cheyenne). If the Corlett School should become available in the near future, this could also be considered as an alternative location. The responsible agency would be the City-County Health Unit.
- o During the construction period one additional professional/paraprofessional could be hired to offset impacts associated with immigrating population. The responsible agency would be the City-County Health Unit.
- o Establishment of a satellite clinic in a central location in the City of Cheyenne to provide such services as immunizations, throat cultures, prenatal clinics, preventive medicine clinics, and blood pressure clinics. The clinic would be coordinated through the City-County Health Unit; the clinic's staff would be under the jurisdiction of the Nursing Services Director. The clinic would be maintained for the duration of construction activities, but would not be limited to project-associated personnel. This facility would serve to alleviate space pressures currently experienced by the City-County Health Unit. Staffing would include one public health nurse and one clinic clerk/aide. The responsible implementing agency would be the City-County Health Unit.
- o Information on demographic characteristics and medical histories of project personnel should be gathered through a questionnaire given to each employee to be turned in to the Impact Coordinator's office. This mitigation would provide necessary information for planning and monitoring of health service impacts, and should be implemented early in the project. The responsible implementing agency will be the health planning committee.
- o Develop a mechanism to provide additional financial resources to public services that experience unanticipated impacts. This mitigation measure will be effective in alleviating those additional impacts that may occur to specific public services or agencies that may not have been planned for prior to project construction. If selected, this fund should be established in 1984 prior to project-related immigration. The responsible agencies for implementing this mitigation are the City of Cheyenne and Laramie County.

- o Institute a monitoring program to allow determination of those agencies whose capacity has been exceeded by the impact population as well as those unmet needs that, if left unmet, will lead to major problems in the community's well-being. This program should be implemented in early 1984 to allow the community to better coordinate its impact planning efforts and to better utilize funding for impact mitigation purposes. While monitoring itself will not reduce level of impact or significance, it will allow the community to be more efficient in its handling of these impacts. The responsible agency for implementing this measure is the Laramie County Health Planning Committee.

#### 3.1.6.6 Human Services

The following mitigation measures for impacts on human services are presented for consideration:

- o Provision of additional staff for Youth Alternatives and Attention Home. Coordination among youth-related programs of all types should be thorough and structured, so as to comprehensively monitor youth problems and needs on an ongoing basis. Greater emphasis on outreach and prevention programs could be implemented. Implementing agencies for staffing coordination and outreach are Youth Alternatives, Attention Home, Project Hope, Awareness House, and the school system. Comprehensive planning should start in the fourth quarter of 1984 for these programs; implementation should occur in January 1985.
- o Provision of additional space for immigrating youth will be a problem in the Attention Home. At any time during 1985 to 1992 immigrant youth may not be able to access services of the home. Alternative Mitigation measures include:
  - 1) Enhancing emergency foster care programs to provide appropriate training to foster care parents to perform as therapists;
  - 2) Reducing the average length of stay for youth clients; or
  - 3) Opening an additional Attention Home.
- o Provision of appropriate staff for Southeast Wyoming Mental Health Center and F.E. Warren Mental Health Clinic. The Southeast Wyoming Mental Health Center specifically should have staff related to mental health emergency care systems and F.E. Warren AFB should have staff directed at handling child and spouse abuse problems. Implementation should occur by July 1985. The implementing agencies are Southeast Wyoming Mental Health Center of Laramie County and F.E. Warren AFB.
- o Institution of a monitoring program to determine those agencies whose capacity has been exceeded by the impact population as well as those unmet needs that, if left unmet, will lead to major problems in the community's well-being. This program should be implemented to allow the community to better coordinate its impact planning efforts and to better utilize funding for impact mitigation purposes. While monitoring itself will not reduce level of impact or significance, it will allow the community to be more efficient in its handling of these impacts. The responsible agencies for implementing this mitigation measure are the human service agencies.

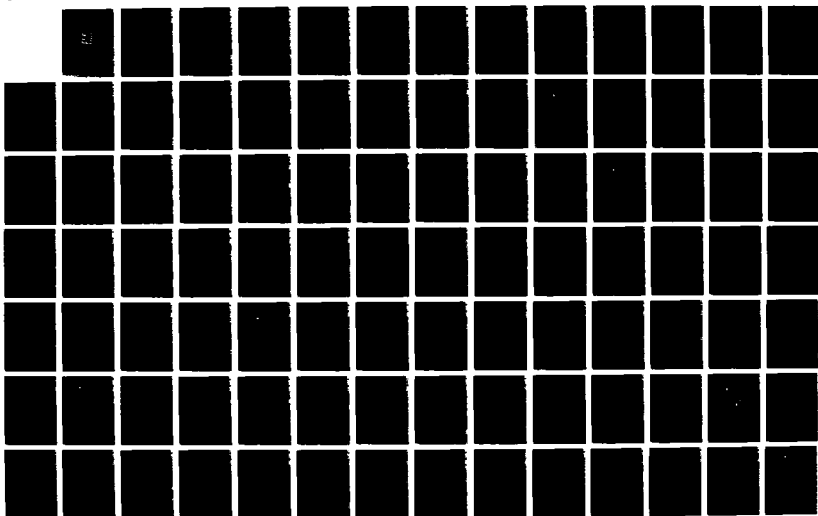
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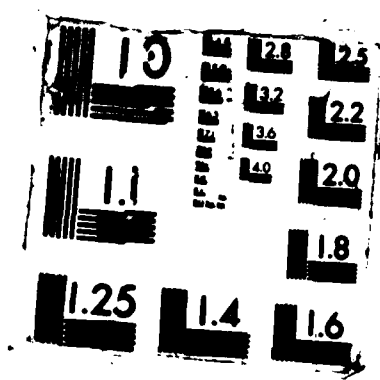
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- o Development of a mechanism to provide additional financial resources outside of the budget process to public services that experience unanticipated impacts. This mitigation measure will be effective in alleviating those additional impacts that may occur to special public services or agencies that may not have been planned for prior to project construction. If selected, this fund should be established in 1984 prior to project-related immigration. The responsible agency for implementing this mitigation is the Laramie County government.
- o Provision of appropriate resources to the Salvation Army to assist in added food costs brought on by immigrating unemployable job-seekers related to the Peacekeeper project. The Laramie County Salvation Army is currently operating at a deficit and may not be able to continue its free meal program to indigents if assistance is not made available. The measure should be implemented by June 1984. The responsible implementing agency is the Salvation Army.
- o Provision of family violence prevention programs as necessary (i.e., Parenting Skills Training). Provision of additional staff and partial provision of renovated space will be necessitated for Grandma's Safe House and the Community Center on Domestic Violence in order to meet the needs of the immigrating population. Renovation should occur by July 1985. Parenting skills classes and appropriate staffing should be implemented in January 1985. The agencies responsible for implementing these mitigation measures are Grandma's Safe House, the Community Center on Domestic Violence, and F.E. Warren Mental Health Clinic and Chaplain's office.
- o Provision of appropriate staffing to the Laramie County Office of Public Assistance and Social Services. This mitigation measure will be effective in decreasing child abuse and spouse abuse problems within the immigrant population. In the income maintenance area, appropriate staffing may be necessary during the downside of the project due to the potential for an increase in clients. The social workers involved in child and spouse abuse should be hired by January, 1985. The implementing agency responsible will be the Laramie County Office of Public Assistance and Social Services.
- o Provision of full and part-time staff in the following agencies during peak year of impact are necessitated to mitigate substance abuse problems within the immigrating population: F.E. Warren Social Action Office, Alcohol Receiving Center, Cheyenne Halfway House for Alcoholics, Project Hope, New Morning Awareness House, and Pathfinder. See Appendix C in the Public Services and Facilities EPTR for specific staffing requirements for each agency.
- o Provision of drug and alcohol abuse education and prevention programs to mitigate substance abuse problems in the immigrant population. Programs could be implemented in the schools, at the jobsite, through the media, and in social groups. Resource materials could be provided to all agencies involved in substance abuse programs. Coordination among services providing mental health and substance abuse programs is necessary to understand the extent of social-psychological needs and stresses within the immigrant population. This will allow the project-related employees to understand and monitor needs of employees and implement measures for preventing substance abuse and mental health problems. This measure should be instituted immediately upon beginning project work and carry on throughout the construction period, and should be implemented by the Alcohol Receiving Center and contractors.

- o The Alcohol Receiving Center could be moved to an alternate rented location. The space vacated by its moving would allow the Halfway House to expand to a size appropriate to meet the needs of the immigrating population. Adequate space in a new rented facility should be able to accommodate a maximum of 15 persons on an as-needed basis. These measures should be implemented in 1985. Responsible agencies for implementation are all substance abuse programs with specific emphasis by Southeast Wyoming Mental Health Center of Laramie County.
- o Provision of a part-time staff person for the Cottonwood YWCA. This person would be used to alleviate project impact demand on the current YWCA director, who is responsible for all programs of the YWCA. If selected this mitigation measure will be effective in meeting needs of unwed mothers, and should be implemented in June 1985. The responsible agency for implementing this mitigation measure is the YWCA.
- o Development and distribution to project-related employees of an information resource directory on family planning and sex education services in Laramie County. This would alleviate potential impacts on homes for unwed mothers and should be viewed as a prevention measure. The resource directory could also be made available to high school females, F.E. Warren AFB Hospital, and the YWCA. Implementing responsibility lies with the family planning component of the City-County Health Unit. If selected, this mitigation measure should be implemented in early 1984.
- o Development of a Human Services Coordinating Council with members being directors of concerned agencies. This mitigative measure will be effective in planning, coordination, and distribution of available resources in human services. The council could be a pivotal body in a monitoring process of agency needs. Identification of resource needs within agencies as related to the impact population would be collectively identified within this group. This group would also be responsible for creating and distributing comprehensive information on human service resources to project-related employees. One full-time equivalent Human Service Impact Coordinator could be established to administer the council, as well as keep records and provide information. The responsible agencies for this measure are Laramie County government and the respective agencies. If selected, this measure should be implemented by June 1984.
- o One full-time equivalent could be hired to work under the Human Service Coordinating Council Administrator as a Prevention Specialist. This person could be provided to prevent common problems of impact towns, such as "we-they" splits, alienation, mental health problems, alcohol and drug abuse, family violence, parenting issues, stress management, neighborhood/social disruptions. This person would act as a consultant to all human services in program development related to prevention needs. If selected, this mitigation measure should be implemented in the first quarter of calendar year 1985 by the Laramie County government.
- o Open an Impact Office related to public services and facilities. Establish within it a comprehensive information referral and resource center. It would be the centralized point for all impact issues related to public services and facilities. Housing, human service resources, and job referral information could be centralized and distributed from this location. This office could house the administration of the Human Services Coordinating Council, the prevention specialist, and all records and data related to project impact monitoring.

Centralized data processing for the immigrating population could be implemented here also. Demographic characteristics of the immigrant population could be established, and computerized for planning purposes. This would allow a mechanism for identifying the population distribution of immigrants in Wyoming. Responsibility for the implementation of these measures would be held by the City of Cheyenne or Laramie County.

- o Establishment of a community resources center, including a temporary shelter for transients, at the Old Johnson Junior High School. The School District prefers trading versus selling the building. If the City or the County are willing to offer land for trade, and this building could be accessed, it could be used as the Impact Office and or the County Human Service Coordinating Council. Moving the Volunteer Information/Volunteer Action Center to this facility would add to a centralized comprehensive in-processing center and communitywide information and referral center. A computer, used for identifying and maintaining demographics of the immigrating population for the Impact Office, could also be used for maintaining and updating an information and referral data base on human services housing, job information, and a volunteer skills bank. Classroom space could be used for conducting volunteer workshops. If selected, this measure would also mitigate problems related to project employee alienation from the long-term resident community. A portion of the original Johnson Junior High could be used for billeting any excess overflow of transients to the area. The school's gymnasium could be renovated to handle transients related to project impact. This is a functional utilization of the space. Shower and kitchen facilities already exist in the building to meet demands for the this type of billeting. Renovation of the facility should begin in late 1984. The responsible agencies for implementing this mitigation measure could be Laramie County School District No. 1, Laramie County government, and the City of Cheyenne.
- o In order to appropriately provide for the mental health needs of project-related employees, it is presented that contractors could provide mental health insurance for employees. This mitigation measure will assure appropriate mental health services for project employees. Implementation of this mitigation measure would be the responsibility of the project contractors.
- o Project-related contract employees could become part of the United Fund Campaign of Laramie County. Monies raised from employees on the project could be directed to the Laramie County United Way. This would assist in mitigating the impacts by project employees on services funded by United Way. If chosen, this measure could be implemented by contractors.
- o Institute alcohol prevention programs for the immigrating population to preclude disproportionate utilization of local alcohol abuse facilities and services. Examples of these prevention programs would be educational/training sessions with contract employees regarding alcohol traffic offenses and strictly-enforced driving while under the influence laws. The responsible implementing agency for this would be the Cheyenne Police Department, Laramie County Sheriff's Department, the Wyoming Highway Patrol, and the project contractors. To reduce traffic accidents due to driving while intoxicated, a "tipsy taxi" service for project-related employees could be provided. This would be a 24-hour service for people unable to drive after consuming alcoholic beverages. Implementation should begin by January 1985. Agencies responsible for implementing alcohol-related substance abuse programs are Southeast Wyoming Mental Health Clinic and related substance abuse programs.

- o Establish a volunteer skills bank and expanded volunteer clearinghouse to provide for appropriate staffing of agencies heavily utilizing volunteer support. This will assist in mitigating project impact on the volunteer workforce. Volunteer programs and training that could be implemented include:
  - 1) Resident prevention specialists to educate other residents on how to prevent common problems of impact towns (i.e., "we-they" splits, alienation, crime, mental health problems, alcohol and drug abuse, family violence and parenting issues, stress, money management, and disruption of neighborhoods, work settings, social clubs, schools and churches).
  - 2) Newcomers groups - Welcome Wagon, Community Directory, and employers help new residents adapt to the community.
  - 3) Neighborhood development to help established residents adapt to and assist new residents to settle into neighborhoods.
  - 4) A computer to keep updated information on services and resources available, and list needs of the immigrating population. If colocated with the Impact Office and the Human Services Coordinating Council, the computer would be able to serve both agencies. If selected, these mitigation measures should be implemented by January 1985. The responsible agencies for implementing this mitigation measure would be the Volunteer Information Center/Volunteer Action Center and the Laramie County government.

#### Kimball County

- o The provision of additional staff for the Department of Social Services. This mitigation measure will be effective in providing adequate staffing and services based on existing levels of service. This measure should be implemented by 1987. The responsible agency for implementing this mitigation measure is the Kimball County Department of Social Services.
- o In order to mitigate impacts associated with the potential population of job-seekers and transients, a mechanism should be set up to provide emergency aid through appropriate human service agencies and to meet potential unanticipated service demands. This measure, if selected, should be implemented in mid-1984 by the County and the affected agencies.
- o A monitoring program implemented by the human service agencies in Kimball County, as well as in the regional provider agencies located in Scottsbluff, would provide information to planners and assist in evaluating project impacts. If increased demands on the regional agencies are demonstrated to occur due to the project population, appropriate mitigation measures can be developed. This measure, if selected, should be implemented in mid-1984 by the affected agencies.

#### Platte County

- o The provision of additional staff for the Mental Health Center. This mitigation measure will be effective in providing adequate staffing to return to the existing service level for mental health services. The responsible agency for implementing this mitigation measure is the Southeast Wyoming Mental Health Center.

- o Additional office space for staff members could be provided within the existing facility or accommodated through the school system.
- o The provision of additional staff for the income maintenance and social service components of the Department of Public Assistance and Social Services. This mitigation measure will be effective in providing adequate staffing and services according to service standards. This measure should be implemented by 1987. The responsible agency for implementing this mitigation measure is Platte County Department of Public Assistance and Social Services.
- o The addition of two office spaces in the existing facility should be provided to house the additional staff. If adequate space cannot be provided in the existing facility, space should be rented in a convenient location. This measure should be implemented by 1987 in conjunction with addition to the staff.

#### 3.1.6.6.7 General Government

The following mitigation measures for impacts on general government are presented for consideration:

##### 3.1.6.6.7.1 Laramie County

- o Hire additional staff to assist in providing services to the general public and other County government offices. This mitigation could be effective in maintaining 1983 levels of service and preventing degradation of same. Hiring should begin in 1984 and additional staffing should be maintained through 1992. Implementation would be the County's responsibility.
- o Provide additional funds for increased job training and personnel development for County employees. This mitigation could provide valuable training which cannot be met entirely by normal budgets, and could mitigate part of the need for additional staffing. Implementation should occur in 1984 and be initiated by the County.
- o Provide funds for planning, purchasing, and operating increased data processing and computer equipment including hardware, software, and training. This mitigation could also mitigate part of the need for additional staffing. Planning would be performed by the County with assistance from outside professionals. Purchases would be from local or regional suppliers. Training could be provided by the supplier/manufacturer and internally by the County. The County would be responsible for implementing this measure.
- o Provide additional space outside of the County Building to house discrete County general government functions, thereby making existing County Building space available for additional staff. This mitigation could serve to alleviate the problem of finding space for additional County employees. Space could be provided through leasing from the private market or from the City of Cheyenne, or from construction or remodeling of additional space. In addition, office space in old Johnson Junior High School could be utilized, or space could be rented from the City in the old Police Department facility when it is vacated. Space should be provided beginning in 1984 and continuing through 1992. The agency responsible for acquiring this space would be the office whose space in the County Building or another location is to be relocated.

- o Provide additional information packages to existing information distribution centers (such as the Chamber of Commerce) regarding County/State permitting, licensing, and other requirements. This mitigation could assist in informing the public, especially newcomers, on what is required, when it is required, and how to accomplish the requirements in the most efficient manner. This should be provided from 1984 to 1992 by the County.
- o Revise the State of Wyoming statute which restricts the sale of annual vehicle license renewals to the months of December, January, and February. This could serve to mitigate temporary additional staffing during this period and could provide an increased level of service to the public at lower cost. The responsibility for this mitigation rests with the Wyoming Legislature. To be most effective, the change should take place prior to December 1, 1984.
- o In order to prevent degradation of County gravel roadways affected by the Proposed Action, the County could hire additional operators and lease equipment as required. If experienced operators were not available from the local labor market, additional staff could be sought from the region. If this fails, an operator trainee could be hired (1 year in advance of the beginning of silo modification) in 1985 and trained by the County and/or outside specialists. Machinery could be leased from a local supplier. If necessary, maintenance could be conducted by private enterprise. For the 1989 silo modification period, a parallel scenario would begin in 1988.
- o Institute a monitoring program to allow determination of those agencies whose capacity has been exceeded by the impact population as well as those unmet needs that, if left unmet, will lead to major problems in the community's well-being. This program should be implemented in early 1984 to allow the community to better coordinate its impact planning efforts and to better utilize funding for impact mitigation purposes. While monitoring itself will not reduce level of impact or significance it will allow the community to be more efficient in its handling of the impacts. The responsible agencies for implementing this mitigation measure are the local public service agencies.
- o Develop a mechanism to provide additional financial resources to public services that experience unanticipated impacts. This mitigation measure could be effective in alleviating those additional impacts that may occur to specific public services, or agencies that may not have been planned for prior to project construction. If selected, this fund should be established in 1984 prior to project-related immigration. The responsible agency for implementing this mitigation would be Laramie County.
- o Relocate County maintenance activities to new or other facilities of higher standards in a more suitable location. The responsibility for this action would rest with the County Engineer's office. This measure could serve to reduce additional staff and space for Laramie County.

#### 3.1.6.6.7.2 City of Cheyenne

- o Hire additional staff to assist in providing services to the public and other city government offices. This mitigation could be effective in maintaining 1983 levels of service or preventing degradation of same. Hiring should begin in 1984 and additional staffing maintained through 1992, and would be the responsibility of the City.

- o Provide additional funds for increased job training and personnel development for City employees. This mitigation could provide valuable training which cannot be met entirely by normal budgets, and could mitigate part of the need for additional staffing. Implementation would be the responsibility of the City.
- o Provide funds for planning, purchasing, and operating increased data processing and computer equipment including hardware, software, and training. This mitigation could also mitigate part of the need for additional staffing. Planning would be performed by the City with assistance from outside professionals. Purchase would be from local or regional suppliers. Training would be provided by the supplier/manufacturer and internally by the City, with assistance from outside professionals. Purchase would be from local or regional suppliers. Training could be provided by the supplier/manufacturer and internally by the City. Implementation should occur in 1984 by the City.
- o Provide additional information packages to existing information distribution centers (such as the Chamber of Commerce) regarding City permitting, licensing, and other requirements. This mitigation would assist in informing the public, especially newcomers, on what is required, when it is required, and how to accomplish the requirements in the most efficient manner. This should be provided from 1984 to 1992 by the City.
- o In order to maintain the 1983 level of equipment and vehicle maintenance service, additional maintenance staff could be hired in late 1984. If skilled labor is unavailable, hiring could take place in early 1984 to provide necessary training and experience. Space could be provided through off-hour use of maintenance facilities. In lieu of hiring staff and using City facilities, maintenance could be performed by private contract through local businesses. This mitigation would be implemented by the City of Cheyenne.
- o Develop a mechanism to provide additional financial resources to public services that experience unanticipated impacts. This mitigation measure will be effective in alleviating those additional impacts that may occur to specific public services or agencies that may not have been planned for prior to project construction. If selected, this mechanism should be established in 1984 prior to project-related immigration. The responsible agency for implementing this mitigation is the City of Cheyenne.
- o Institute a monitoring program to determine those agencies whose capacities have been exceeded by the impact population as well as those unmet needs that, if left unmet, will lead to major problems in the community's well-being. This program should be implemented in early 1984. While monitoring itself will not reduce level of impact or significance, it will allow the community to be more efficient in its handling of these impacts. The responsible agencies for implementing this mitigation measure are the local public service agencies.

#### 3.1.6.6.7.3 Platte County

- o Hire one additional full-time equivalent general staff person in late 1984 to assist Platte County government agencies through 1988. This measure would relieve pressure on County staffing and help to maintain 1983 levels of service.

- o In order to prevent degradation of gravel roadways maintained by the County and affected by silo refurbishing, the County could add a temporary full-time equipment operator in late 1985 and maintain that position through 1986. If an experienced operator is not available, the County would need to hire a person 1 year earlier and training would need to be provided, both outside and in-house. Equipment could be leased or purchased through a supplier in Cheyenne. Maintenance could be performed by the County or by private contract with a local business.
- o Develop a mechanism to provide additional financial resources to public services that experience unanticipated impacts. This mitigation measure could be effective in alleviating those additional impacts that may occur to specific public services or agencies that may not have been planned for prior to project construction. If selected, this agency should be established in 1984 prior to project-related immigration. The responsible agency for implementing this mitigation is Platte County.
- o Institute a monitoring program to determine those agencies whose capacities have been exceeded by the impact population as well as those unmet needs that, if left unmet, will lead to major problems in the community's well-being. This program should be implemented in early 1984 to allow the community to better coordinate its impact planning efforts and to better utilize funding for impact mitigation purposes. While monitoring itself will not reduce level of impact or significance, it will allow the community to be more efficient in its handling of these impacts. The responsible agencies for implementing this mitigation measure are the local public service agencies.

#### 3.1.6.6.8 Libraries

The following mitigation measures for impacts on library services are offered for consideration:

- o The hiring of additional staff and purchase of additional books will meet the project-related population demand for books and library services according to standards of the Wyoming State Library. The books and staff could be added in yearly increments to the main library, and to a lesser degree to branches, in line with population immigration projected. Following the peak year of immigration, as project population declines, no further book additions will be required and staffing can be phased down. The responsible agencies for implementing this mitigation measure are the public library systems.
- o Increase use of Inter-Library Loans to share library resources available statewide with affected county libraries. This mitigation measure will be effective in alleviating increased demands for service and requests for special resources not widely available in all libraries. The automated circulation system currently being developed by the Wyoming State Library will be useful in this effort. The responsible agencies for implementation are the Wyoming State Library and County libraries.
- o Increase hours of operation of main and branch library facilities. This mitigation measure would be useful to alleviate increased demands for services and library space, and if selected, should be implemented during the first year of project immigration. The responsible agencies for implementation of this measure are the public library systems.



- o Increase coordination between public libraries and school libraries to increase access to books and special programs. This mitigation measure will aid in provision of books and services to both baseline and project populations, and should be implemented on a continuing basis. The responsible agencies for implementation of this mitigation measure are the public libraries in cooperation with the school system.
- o Institution of book deposit requirements for new borrowers and new or often-borrowed books to alleviate book loss increases. This mitigation measure has been effective in reducing book losses in other impacted communities, and should be implemented early in project construction and population immigration to be effective. The responsible agencies would be the public libraries.

#### 3.1.6.7 Unavoidable Adverse Impacts

There are no unavoidable adverse impacts on public services and facilities.

#### 3.1.6.8 Irreversible and Irretrievable Resource Commitments

There are no irreversible or irretrievable resource commitments due to impacts on public services and facilities.

#### 3.1.6.9 The Relationship Between Local Short-Term Use of Man's Environment and Maintenance and Enhancement of Long-Term Productivity

The project impacts on public services and facilities do not involve the short-term use of resources which would be detrimental to long-term productivity.

### **3.1.7      Utilities**

#### **3.1.7.1    Introduction**

This section describes the impacts of the Proposed Action on water supply, wastewater, solid waste, stormwater, and telephone facilities and services. Descriptions of the criteria used to classify impacts and their significance, as well as the procedures used to estimate impacts, are contained in the following subsections.

Emphasis in all utilities sections of this report is on facilities now in place and to be added. The distinction of importance is that additional gallons of water to be supplied or pounds of garbage to be collected are not necessarily impacts requiring mitigation. Needs for additional pumps or pipelines, or additional garbage trucks or disposal-site equipment, as examples, are the focal point for impact assessment.

Population projections for the Proposed Action alternatives were all assigned to individual communities within the Region of Influence, and no project-induced growth was assigned to Banner County, Nebraska. As a result, utilities impacts will occur only in towns and cities. Accordingly, analysis was focused on the Areas of Concentrated Study defined earlier (specific towns, cities, and the Cheyenne Urban Area as defined for utilities). For some cities, analyses were performed for only those elements of utilities (e.g., water supply or solid waste) whose existing capacities were not clearly in excess of all foreseeable needs with and without the project through 1992.

The information in this section is based in large part on data and detailed analyses contained in a companion volume, the Utilities Environmental Planning Technical Report.

#### **3.1.7.2    Definition of Levels of Impacts**

Impacts on utilities are directly related to increased service populations and population-induced development and less directly to specific construction activities. Levels of impact are related to effects on operations and induced requirements for new facilities and equipment as follows:

- o Negligible Impact - Will have no noticeable effect on operating practices and will not require additional equipment or facilities. No degradation of existing performance parameters or service levels will be noted.
- o Low Impact - Will require changes in operating practices and cause temporary operating deficiencies and degradation of existing performance or service to occur. Minor additions of equipment might be required.
- o Moderate Impact - Will overload existing facilities for protracted periods, causing isolated failures and corresponding reductions in service. New equipment or facilities or expansions of existing facilities will be needed.
- o High Impact - Will cause major disruptions of service and serious degradation of existing performance characteristics. Major new facilities and equipment will be required.

Examples of impacts are given below for each element of utilities that would be rated with this scale.

#### **3.1.7.2.1      Water Treatment and Distribution**

Increased service populations will increase water demand. Effects of the project might be of such duration and extent that vital services, such as firefighting, could be threatened. This would be a moderate impact.

#### **3.1.7.2.2      Wastewater**

Increased service populations will increase requirements for collection and treatment facilities. With the increasing population, water quality standards may first be temporarily and occasionally violated in receiving waters (a low impact).

#### **3.1.7.2.3      Solid Waste**

Increased generation of solid waste associated with increased population and construction-related activity could require the need for new collection equipment and disposal-site facilities. This would be a moderate impact.

#### **3.1.7.2.4      Stormwater**

Increased land development, rather than population growth, affects the need for stormwater facilities. At a highly increased level of development, local flooding and major downstream flooding could occur. Resulting financial loss would result in a high impact.

#### **3.1.7.2.5      Telephone Service**

Increased demand for telephone service will be met first with existing facilities. With increasing demand, additions of new equipment and facilities will be necessary. During construction, high impacts might result from inadvertent ruptures to buried cable or needs for moving overhead wires.

#### **3.1.7.3      Determination of Significance Criteria**

If any of the following conditions were present, impacts have been considered significant:

- o The impact will worsen, either slightly or considerably, a preexisting deteriorated environmental condition or overload an already inadequate facility;
- o The impact affects public health or safety;
- o The impact is likely to be highly controversial;
- o The impact is highly uncertain or involves unique or unknown risks;
- o The project-induced result and its impact are related to other project-induced results with individually unimportant but cumulatively important impacts;
- o The project-induced result or its impact threatens the violation of some federal, state, or local law or regulations imposed for the protection of the environment; and
- o Extensive institutional responses to the impact would be necessary (e.g., if a wastewater agency would have to commit to a major or unusual planning or reprogramming project to ameliorate the induced impacts).

#### **3.1.7.4     Assumptions, Assumed Mitigations, and Environmental Impacts of the Proposed Action and Project Alternatives**

**Assumptions.** It has been assumed that completion of construction in accordance with the conclusions of the 201 Facilities Plan will occur by the end of 1987. Incremental steps will include the early phase-out of the South Cheyenne plant. The design for this step will be completed in 1984, with construction immediately to follow.

**Assumed Mitigations.** Although mitigations are eventually described for impacts identified through analysis, no mitigations have been assumed at the outset of analysis for utilities problems.

**Environmental Impacts.** Environmental impacts of the Proposed Action and project alternatives are discussed in the following subsections.

For each Area of Concentrated Study, water demands were computed as functions of existing unit per capita usage rates and baseline future and Proposed Action populations. These demands were then compared to existing capacities of supply facilities, and any needed expansions were indicated. Additionally, because Cheyenne will receive most of the project-induced population growth, detailed computer simulations with the WATSIM model were made to examine the basic delivery capacity and the firefighting capability of that city's distribution network.

For each Area of Concentrated Study, wastewater quantities have been computed as functions of existing unit per capita rates of discharge and baseline future and Proposed Action populations. These wasteloads were then compared to existing capacities of waste treatment facilities, and any needed expansions were indicated. CAPDET modeling was used for treatment plants in several communities. Additionally, detailed computer simulations with the Storm Water Management Model were made to examine the sanitary sewer networks in Cheyenne and South Cheyenne.

Solid waste loads have been computed as functions of unit waste generation rates and expected populations under baseline future and Proposed Action conditions. A value of 5.0 pounds per person per day was used for all permanent immigrants, a value of 3.0 pounds per person per day was used for weekly commuters and transients, and 2.76 pounds per person per day was used for F.E. Warren AFB. Waste loads of construction debris generated on the base during 1984 and 1985 were estimated from construction schedules and plans for various building sites.

Peak flow rates of storm runoff were converted to equivalent storm sewers necessary, and these numbers were compared with storm sewers in place or needed under existing conditions. New storm sewers, if any, were noted. Except in Cheyenne, the project did not induce needs for more storm sewers than were needed under baseline conditions.

Existing telephone service capacities owned by Mountain Bell or United Telephone Company of the West were compared with telephone customer demands in the peak year of project immigration in each community. Necessary additions to telephone service capacity, if any, were noted. Particularly scrutinized were the telephone connections and equipment needed to be added at F.E. Warren AFB during the early construction period. New Mountain Bell equipment needs were noted.

### 3.1.7.4.1 Water Treatment and Distribution

#### 3.1.7.4.1.1 Baseline Future - No Action Alternative

Cheyenne Urban Area. Water treatment capacity at both of Cheyenne's water treatment plants totals 26.0 million gallons per day (mgd). This treated water can be supplemented with groundwater, which does not require treatment other than chlorination, from City wellfields. The sustained capacity for summer periods has been estimated here to be 6.0 to 7.0 mgd, although the City would prefer to operate these wells at less than half this rate on a year-round basis (around 2 mgd). So total supply capacity is about 32.5 mgd. Maximum-day demands (an estimate of the recurring daily demand in a hot period of the average summer, taken here to be 2.3 times the annual average-day demand) in 1983 will be over 29 mgd. By 1987, under baseline conditions, maximum-day demands will reach 32.2 mgd, essentially the total capacity available. By 1992, maximum-day demands will be almost 36 mgd, and nominal available treatment capacity will be exceeded. It should be mentioned that average-day demands are only 12.8 mgd today, and they will reach only 15.6 mgd by 1992. Moreover, it is possible that for short periods (such as the peak week or the peak month) the wellfields could deliver as much as 9.0 mgd or more and make up the shortfall in supply. Nonetheless, it seems prudent for the City to be planning now for expansions to treated water capacity. (It should also be noted that 31.5 mgd were delivered on the single peak day in 1980, and 33.5 mgd were distributed on the singular peak day in 1983, so available capacity has already been strained.)

With respect to the distribution system, computer simulations have shown that the existing system can supply water to virtually all places with adequate pressures during a 1990 peak-day demand and with firefighting demands imposed as well. The exception noted was very low pressures of 10 to 20 pounds per square inch (psi) in an area around the Frontier Mall shopping center when a 4,860 gallons per minute (gpm) firefighting event was simulated during 1983 and 1990 peak-day demand conditions. As further in-filling development occurs in the immediate area, sufficient interconnection and looping with the 8-inch pipe will cause sustainable, higher, and safer pressures in that neighborhood.

Firefighting events as far away from the City's storage reservoirs as Laramie County Community College in South Cheyenne were modeled with flows of 750 to 1,000 gpm, and safe pressures (20 psi or above) were maintained with 1990 peak-day demands imposed. An 8,000-gpm fire event was simulated in the downtown area, and pressures there remained at 76 psi or above, a very safe level. However, a fire event at the southern extremity of South Cheyenne led to deteriorated water pressure (below 20 psi) when a 450-gpm fire demand was imposed at a fire hydrant with 1990 maximum-day demands imposed throughout the rest of the community. Further development in the area, with additional water main installation and interconnection, will improve this situation.

Other Communities. All other communities that were Areas of Concentrated Study have more than adequate water supply, treatment, and distribution capacity to supply the needs of their populations throughout the baseline period.

#### 3.1.7.4.1.2 Proposed Action

The populations induced by the project nowhere will be large enough to trigger requirements for new facilities for water treatment and distribution. However, it should be noted from Table 3.1.7-1 that treatment capacity (26 mgd) and short-term wellfield capacity (9 mgd) together (35 mgd) will be overtaxed by both baseline and continuing project-induced demands by 1992. Indeed peak-hour (or as much as peak 6-hour period) demand rates will exceed nominal delivery capacities by 1987. The indicated shortages for short periods will be as high as 7.4 mgd by 1992 with the project, compared with 7.1 mgd without the project. The

Table 3.1.7-1

## CHEYENNE URRAN AREA WATER DISTRIBUTION SYSTEM DEMANDS AND CAPACITIES

Baseline Years (1)	Population Served (2)	Average-Day Water Use A, mgd (3)	Nominal Maximum-Day Water Use (2.3 x A), mgd (4)	Estimated Peak 6-Hour Water Use Rate (2.7 x A) <sup>1</sup> , mgd (5)	Indicated Probable Capacity mgd (6)	Maximum-Day Shortage mgd <sup>2</sup> (7)-(4)-(6)	Peak 6-Hour Shortage Rate mgd (8)-(5)-(6)
1983	58,954	12.8	29.4	34.6	35.0	(5.6)	(0.4)
1987	63,182	14.0	32.2	37.8	35.0	(2.8)	2.8
1990	67,048	15.0	34.5	40.5	35.0	(0.5)	5.5
1992	69,721	15.6	35.9	42.1	35.0	0.9	7.1
<u>Project Years</u>							
1983	58,954	12.8	29.4	34.6	35.0	(5.6)	(0.4)
1987	65,832	14.4	33.1	38.9	35.0	(1.9)	3.9
1990	68,247	15.2	34.9	41.0	35.0	(0.1)	6.0
1992	70,646	15.7	36.1	42.4	35.0	1.1	7.4

<sup>1</sup> Multiplier used by the Cheyenne Board of Public Utilities. 1983 values in (4) and (5) can be compared to 33.5 actually measured on a single day in the summer of 1983.

<sup>2</sup> Computed from Nominal Maximum-Day Water Use, less Indicated Probable Capacity. Numbers in parentheses indicate amount of overage rather than shortage.

Source: Cheyenne Board of Public Utilities for peaking multipliers.

shortages could be made up from treated water storage, of which there are 22 million gallons available at a maximum, or from short-term conservation. The shortages for a full day in 1992 of 0.9 mgd without the project and 1.1 mgd with the project could best be avoided by expansions of either treatment capacity for surface water, treated water storage, or wellfield pumping capacity. Because these shortages are being anticipated by the Board of Public Utilities in Cheyenne, it has been assumed that expansions to treated water delivery capacity will be planned in the near future and installed prior to their time of need (1992). The amount of capacity expansion will undoubtedly be determined on the basis of needs projected by the Board of Public Utilities for a period beyond 1992 (the end of the planning period used here), so that determination was beyond the scope of this work. It can be assumed, however, that baseline expansions will be in place to accommodate both baseline and project-induced demands throughout the 1983 to 1992 period, so the impacts of additional water delivery to added customers induced by the project can be ameliorated by charging the new customers at then-existing rates. Hence the impact in Cheyenne, as in all other communities, is rated as negligible and not significant. A minor baseline commitment of resources, such as pipelines and concrete, will be involved; and no short or long-term uses of man's environment will be necessary beyond those areas already committed to water treatment plants, storage reservoirs, and distribution pipes.

#### 3.1.7.4.2 Wastewater

##### 3.1.7.4.2.1 Baseline Future - No Action Alternative

F.E. Warren AFB. The only sanitary sewer in the Region of Influence that cannot accommodate baseline flows throughout the baseline period is the surcharged 12-inch sewer in Cheyenne which accepts F.E. Warren AFB waste flows from a 15-inch sewer on the base. This has been corroborated through computer simulation, which used maximum-day sewage flows.

Cheyenne Urban Area. Treatment plants in Cheyenne need immediate relief or expansion, if baseline flows in 1 or 2-month periods of each year are to be accommodated. The South Cheyenne plant in particular is overloaded.

By 1987 (the peak year of project immigration), the baseline flows to the Crow Creek plant (capacity = 4.0 mgd) and the Dry Creek plant (capacity = 4.5 mgd) will have reached 10.2 mgd in peak months. By 1992, the excess flows over available capacity will have reached 2.7 mgd in peak months. The South Cheyenne plant will have peak monthly (or bimonthly) flows of 0.9 mgd by 1992, in comparison with the 0.6 mgd of useful capacity there now.

A nationally mandated U.S. Environmental Protection Agency (EPA) municipal wastewater planning document used to support construction grant applications and known as a 201 Facilities Plan (Banner Associates 1982), has been filed with the State of Wyoming and the EPA, which describes solutions local officials wish to implement immediately for all these problems. The Plan calls for abandonment of the South Cheyenne plant and diversion of wastewater from that District to the Dry Creek plant, which would be expanded to 7.0 mgd. This plan's features would accommodate average baseline future flows (1992 average month = 10.1 mgd) with the new available capacity (11.0 mgd). However, peak-month flows of 12.1 mgd would exceed the then available capacity.

State and local planning officials have reported that the diversion pipeline from the South Cheyenne plant to the Crow Creek plant, Phase I of the 201 Facilities Plan, is planned to be designed in early 1984, with construction of that part of the Plan to follow immediately. Present schedules call for all Plan phases to be designed, constructed, and in operation before the end of 1987. However, recent local information has also revealed that a flow measurement error at the Crow Creek plant has been discovered, and recent historical flows could be low by as much

as 1.0 mgd as a result of the measurement and recording error. The implications of this error are: 1) the needed expansion of treatment capacity may be larger than the current Plan anticipates, and 2) the impending exceedance of available capacity is moved forward in time, which means that the importance or priority for installing the necessary improvements has merely been increased by the discovery of this gaging inaccuracy. The design process for the second or later phases of the project (the expansion of the Dry Creek plant) will address and determine the new capacity necessary, which most assuredly will be greater than the 7.0 mgd now included in the Plan.

Pine Bluffs, Wyoming. Pine Bluffs has a two-cell, evaporative lagoon system. It is designed for 0.09 mgd, but the current flow is 0.1 mgd. The Town is aware of the overload condition and has applied for grants to help finance expansion by 10 acres of ponds. The CAPDET model has corroborated that expansion is necessary even for existing conditions, much less the 128-person growth expected during the baseline years.

Torrington, Wyoming. Torrington has a 64-acre lagoon system. Some of the wastewater (which has never discharged) evaporates, and much of it seeps into the ground. The lagoons are near capacity now, and in wet years, such as 1983, groundwater actually seeps into the ponds. Expansion or discharge, which the Town prefers to avoid, is indicated, and the Town intends to commission a study soon to determine the improvements, if any, needed for baseline growth.

Other Communities. Sewers and waste treatment plants in all other communities that were Areas of Concentrated Study were determined to be adequate now for collection and treatment of flows anticipated throughout the baseline period.

#### 3.1.7.4.2.2 Proposed Action

F.E. Warren AFB. The additional work and building at F.E. Warren AFB with the project will contribute very slightly to the surcharging of the 12-inch sewer downstream of the base's 15-inch sewer. This preexisting condition is largely exacerbated, and perhaps solely caused, by infiltration and inflow to the base's sewer system, not a condition directly attributable to base population. However, this impact is rated as low, short term, but significant at the local level simply because the exacerbation is to a preexisting overloaded facility.

Cheyenne Urban Area. On an average-day basis, the waste flow in 1987 (peak-project year with 2,650 immigrants) will be 9.56 mgd, compared with existing capacity in place of 9.1 mgd. If the current 201 Plan is implemented prior to 1987, there will be 11.0 mgd capacity at the Crow Creek and Dry Creek plants.

The current 201 Plan's upgrades and expansions are needed as soon as possible just to accommodate baseline capacity needs, and they will accommodate baseline plus Proposed Action wasteflows, roughly 3 percent higher, equally adequately. The 3-percent addition of wastewater, which can be accommodated within the currently proposed facilities, is considered a low but significant impact at the local level. It is significant not because the impact will be particularly large, but because without implementation of the 201 Plan the added project-related waste discharge will worsen an already deteriorated condition, i.e., violations of discharge requirements, especially at the South Cheyenne plant. Over the long term, system improvements will reduce impacts to a negligible level. However, during the short term (prior to 1985), small exacerbations to discharge violations at South Cheyenne will unavoidably occur during the 201 Plan design and construction phases. This is rated as a low but significant impact at the local level.



Pine Bluffs, Wyoming. The project will add 150 people to Pine Bluffs in 1989, when baseline population will have increased from 1,117 in 1983 to 1,200. Hence, the project will add 12.5 percent to wastewater flows. Adequately sized treatment facilities will be able to treat the small increase easily (0.013 mgd compared with 0.1 to 0.2 mgd needed). However, the Town needs to expand its 0.09 mgd existing plant, and plans are underway to do that, even to accommodate already expected growth. Nonetheless, the project-induced wastewater impact will be negligible and not significant at the local level.

Torrington, Wyoming. In 1987 the project will add a peak of 225 people to Torrington's population (15.7 percent of baseline growth by 1992). The waste treatment lagoon can accommodate both the baseline and the project-induced increases in wasteflow. However, the lagoon either will have to be permitted to discharge or the Town will have to expand its lagoon to contain and evaporate all the wastewater. No violations will occur in either case, and the project's induced waste flow is a negligible and not significant impact on the existing system.

Other Communities. Project-induced immigrations in all other communities that were Areas of Concentrated Study can be accommodated by treatment plants and sewer systems now in place.

### 3.1.7.4.3 Solid Waste

#### 3.1.7.4.3.1 Baseline Future - No Action Alternative

Community Garbage Disposal. Household garbage and other refuse generated throughout the baseline period can be collected and buried in landfills with collection equipment and disposal sites now in existence, with one exception. The City of Cheyenne now operates an 11-route collection fleet and is near that capacity. A twelfth route is to be added soon. By 1992, another 24 tons per day will be generated in the city as a result of baseline growth. Another collection crew and vehicle will be required, for a total of 13 routes, when an additional 10.8 tons per day are generated. At the same time, an additional compactor vehicle will be needed at the disposal site. This will occur by 1988. All other communities have collection equipment and disposal sites adequate to handle all baseline loads of solid waste, which are summarized in Table 3.1.7-2.

Toxic and Hazardous Wastes. Toxic and hazardous waste disposal activities are strictly regulated by state and federal laws. No per capita increases during the baseline years can be anticipated, and current private disposal methods are expected to continue. Community waste disposal landfills throughout the Region of Influence do not and will not accept toxic or hazardous materials for disposal.

Dilute sodium chromate storage at F.E. Warren AFB will continue under baseline conditions. About 500 pounds are now generated and stored each month. Residues of this material will be removed periodically by a registered transporter under contract through the Defense Property Disposal Office. Spent lubricants, contaminated helicopter fuels, and spent battery acids would continue to be removed from the base for reuse, recycle, or reclamation by private parties operating under contract to the Defense Property Disposal Office.

#### 3.1.7.4.3.2 Proposed Action

Community Garbage Disposal. With the exception of the city of Cheyenne, project-induced increases in garbage and other refuse loads would not require new equipment, crews, or disposal-site acreage at any community in the Areas of Concentrated Study between 1983 and

Table 3.1.7-2

## SOLID WASTE GENERATION WITHIN THE REGION OF INFLUENCE

Location		Tons/Day									
		1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Cheyenne South	BF <sup>1</sup>	121.5	122.8	125.7	128.0	130.7	133.5	136.4	139.2	142.2	145.1
	PA <sup>2</sup>	121.5	123.3	128.0	132.3	135.6	138.0	140.7	141.3	143.9	146.7
Cheyenne and Urban Fringe	BF	32.0	32.4	33.3	34.0	34.9	35.7	36.6	37.5	38.5	39.3
	PA	32.0	32.6	34.1	35.3	36.3	37.0	37.9	38.2	39.1	39.9
F.E. Warren AFB	BF	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
	PA	5.0	6.2	6.2	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Subtotal for Cheyenne Urban Area	BF	158.5	160.2	164.0	167.0	170.6	174.2	178.0	181.7	185.7	189.4
	PA	158.5	162.1	168.3	172.6	176.9	180.0	183.6	184.5	188.0	191.6
Total for Cheyenne <sup>3</sup> Urban Area <sup>3</sup>	BF	182	184	189	192	196	200	205	209	214	218
	PA	182	186	194	198	203	207	211	212	216	220
Chugwater	BF	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.7	0.8	0.8
	PA	0.6	0.6	0.8	0.8	0.8	0.7	0.7	0.7	0.8	0.8
Gering	BF	21.4	22.1	22.8	23.5	24.2	24.9	25.6	26.4	27.1	27.9
	PA	21.4	22.1	22.8	23.6	24.3	25.2	25.8	26.4	27.1	27.9
Kimball	BF	7.8	7.8	7.9	7.9	7.9	7.9	8.0	8.0	8.0	8.0
	PA	7.8	7.8	7.9	7.9	8.0	8.1	8.7	8.0	8.0	8.0
Pine Bluffs	BF	2.8	2.8	2.9	2.9	2.9	3.0	3.0	3.0	3.1	3.1
	PA	2.8	2.8	2.9	2.9	2.9	3.3	3.0	3.0	3.1	3.1
Scottsbluff	BF	36.1	36.3	36.6	36.8	37.0	37.1	37.3	37.5	37.7	37.8
	PA	36.1	36.3	36.6	36.9	37.1	37.7	37.8	37.5	37.7	37.8
Torrington	BF	13.8	14.0	14.2	14.7	15.2	15.6	16.2	16.7	17.0	17.4
	PA	13.8	14.0	14.2	14.7	15.7	15.6	16.2	16.7	17.0	17.4
Wheatland	BF	11.3	11.5	11.8	12.0	12.3	12.6	13.0	13.3	13.6	14.0
	PA	11.3	11.5	12.2	13.1	12.8	12.6	13.0	13.3	13.6	14.0

1 BF Baseline Future - No Action Alternative

2 PA Proposed Action

3 Includes 15 percent contribution to landfill by private, unserved individuals and construction activity

1992. This includes conditions with the project or any of its alternatives, none of which would generate greater loads of solid waste. Therefore, impacts to other communities will be negligible.

The city of Cheyenne's loads of solid waste will be increased by another truckload's capacity (10.8 tons per day) by 1986, 1.5 years earlier than under baseline future conditions. Moreover, loads at the City's landfill site will have reached an equipment threshold (200 tons per day) by 1986. (This projection includes consideration of loads of another 15 percent per day now accepted from outlying areas not within the Area of Concentrated Study but in nearby Laramie County.)

In summary, the project will accelerate the need for 1 additional collection vehicle and crew by 1.5 years (from 1987 to 1986) and will accelerate the need for a new compactor at the disposal site by 2 years (1988 to 1986). This impact is rated as low and not significant at the local level, because this impact has been predicted already at the local level, and because the added equipment can be purchased easily by the City with the costs passed to the customers almost unnoticeably. (A \$64,500 truck and an \$180,000 compactor, financed at 8 percent interest, would add roughly \$1.90 per month to the household costs of only the 2,363 project-induced, peak-year new customers. Spread to the roughly 20,000 baseline households as well, who will require the equipment eventually, the homeowner's cost would be even less). No irreversible or irretrievable commitments of resources or long or short-term uses of the environment will ensue.

All project-induced solid wasteloads, along with baseline loads, were also shown in Table 3.1.7-2.

Toxic and Hazardous Wastes. Hazardous waste generation at F.E. Warren AFB specifically related to the project is expected to be much the same in quantity and character as the materials generated in the Minuteman program now.

The generated materials associated with the project will be expended oils and lubricants, paints and thinners, hydraulic and machining fluids, cleaning agents, and adhesives. Federal and state laws regarding the handling and disposal of these wastes will be followed, as they are now. Hence, there will be negligible impacts related to toxic and hazardous wastes at the base.

No nuclear waste will be produced or stored at F.E. Warren AFB as a result of this project.

Toxic and hazardous waste generation in the remainder of the Region of Influence is not expected to change with the project, and baseline collection and recycling activities are projected to remain the same.

Construction Period Wastes from F.E. Warren AFB. During the most intense construction period (1984 and 1985) at F.E. Warren AFB, considerable renovation or removal of existing buildings and removal of pavement will occur.

The volume of building materials to be discarded has been estimated at 580 cubic yards (cy). This material will include broken pavement that must be removed (over half the load) and structural members, walls, and roofing from some small buildings that are to be removed and some large buildings that are to be renovated. At a compacted weight of 80 pounds per cubic foot, the total load of discarded material would be 626 tons. Spread over the 2 years at 260 work days per year, this load amounts to 1.2 tons per day.

The disposal practice most predictable will be the use of 25-cy dumpsters placed at individual building sites on the base by construction contractors doing the work. The 580 cy of material will require 23.2 such dumpsters, which could be hauled, 1 at a time, to the City's disposal site. Cheyenne's City Engineer has given assurance that wastes in this low volume would have no impact on the disposal-site operation.

#### 3.1.7.4.4 Stormwater

##### 3.1.7.4.4.1 Baseline Future - No Action Alternative

Only the Cheyenne Urban Area will need additional storm sewers to accommodate its baseline growth into new areas of developing land. All other communities have adequate storm drainage facilities in place to hold the peak runoff rates computed.

Cheyenne has ordinances that require stormwater detention to historical levels of outflow for new developments. In the baseline period there will be a gross demand for housing of 800 acres of single-family homes (4 homes per acre) and 100 acres of multifamily dwelling units (12 units per acre). Storm sewer needs were computed from local regulatory requirements for hypothetical single-family, multifamily, and mobile home developments of 20, 40, 80, and 160 acres. The Cheyenne growth was assumed to be in ten 80-acre single-family developments and two 40-acre and one 20-acre multifamily developments. One 80-acre single-family development will require 5,836 feet of storm sewers ranging in size from 15 to 54 inches. A 20-acre multifamily development will require 2,981 feet of pipe ranging from 15 to 42 inches in diameter. Each of the 40-acre multifamily developments will require 6,264 feet of storm sewers ranging in size from 15 to 72 inches in diameter. Provision of these sewers is presumed to be for protection of the local homes from the 10-year storm event, and the analysis included detention facilities for the 100-year peak flow to be attenuated in outflow to predevelopment 10-year flow rates.

The storm sewers and detention facilities determined to be needed can be assumed to be provided by local developers and their costs assessed in home prices to the new residents. Accordingly, no adverse baseline impacts on the utility infrastructure in Cheyenne are foreseen.

For South Cheyenne, the expected gross demand for new housing is approximately 100 acres of mobile homes. Each of five 20-acre developments of mobile homes will require 1,092 feet of storm sewers ranging in size from 18 to 36 inches in diameter. Again, they will be provided by local developers, and their costs will be passed to new residents through private transactions.

Modeling of storms in the developed parts of the Crow Creek watershed indicated that existing storm sewers should be 1.5 to 2.0 times larger. While no new population is projected to move to these basins, with or without the project, considerable flooding nuisance and damage there will be offset by improvements (enlargements) of the existing storm drains during the baseline period.

##### 3.1.7.4.4.2 Proposed Action

Needs for storm sewers have been computed from net housing demands for project in-migrants. The only net housing requirements that will give rise to needs for additional storm sewers are 40 acres of new single-family homes in Cheyenne and 20 acres of new mobile homes in South Cheyenne. A 40-acre single-family development will require 3,580 feet of storm sewers ranging in size from 15 to 54 inches in diameter. A 20-acre mobile home development will require 1,092 feet of storm sewers ranging in diameter from 18 to 36 inches.

These storm sewers will be provided, as in the baseline case, by private developers, and their costs (like those for roads, street lamps, and other appurtenances) will be included in new-home costs. Outflow from the new developments will be detained in small storage reservoirs that will limit the outflow to predevelopment levels, so there should be no increase in downstream flooding. No project impacts, therefore, will ensue from stormwater.

#### **3.1.7.4.5      Telephone Service**

##### **3.1.7.4.5.1      Baseline Future - No Action Alternative**

Capacities of telephone exchange equipment in each community that was an Area of Concentrated Study were found to be adequate, or plans for expansion were underway to accommodate all baseline growth.

##### **3.1.7.4.5.2      Proposed Action**

To serve the Cheyenne Urban Area, expansions to the central office equipment will probably be needed sooner than is currently planned by Mountain Bell. But installation charges and monthly rates charged by Mountain Bell are already designed to recover such periodic costs for expansion. No increase in customer rates is expected to result from this expansion (Mountain Bell 1983). Nearly 1,400 new customers will be added in 1985 in Cheyenne, in addition to 900 new baseline customers.

Because the Mountain Bell in-dial and out-dial trunklines serving the base are near capacity, these needs will have to be provided by Mountain Bell and purchased by the Air Force. Exact requirements have not yet been determined. This is considered a low, short-term impact and a not significant one at the site and in the local telephone service context. Very minor irreversible or irretrievable commitments of resources will be involved.

In all other communities excess capacity for telephone service exists, or plans for expansion under baseline conditions will more than accommodate expected in-migrant populations.

#### **3.1.7.4.6      Consideration of Alternatives**

Since there are only very minor projected differences in population associated with any of the dispatch station, road, or cable alternatives, the alternatives will not cause any different utilities impacts from the Proposed Action.

#### **3.1.7.5      Summary of Impacts**

##### **3.1.7.5.1      Explanation of Detailed Impact Matrix**

Figure 3.1.7-1 summarizes all the utilities impacts identified. All impacts, except telephone service needs and the surcharging sewer at F.E. Warren AFB, will be local and do not have site-specific or regional relevance. The site-related impacts regarding the F.E. Warren AFB telephone cable capacity also have relevance in the local infrastructure to which these facilities are connected.

In all cases, impacts that are significant will be short-term impacts. This means they will occur (problems must be solved) during the baseline period (1983 to 1992).

Finally, it should be noted that the low but significant rating for Cheyenne's treatment capacity was given because the project's impact will be low if the current 201 Plan for capacity expansion at Dry Creek and abandonment of the South Cheyenne plant is implemented almost


LEGEND		ADVERSE IMPACTS	SIGNIFICANT ADVERSE IMPACTS	PROJECT IMPACTS						
LEVEL OF IMPACT*	LOW	○	●	SHORT TERM			LONG TERM			
	MODERATE	○	●	SITE	LOCAL	REGIONAL	SITE	LOCAL	REGIONAL	
	HIGH	○	●							
POTENTIAL BENEFICIAL EFFECTS										
* MEASURE OF THE AMOUNT OF ENVIRONMENTAL CHANGE										
UTILITIES					●					
Water Treatment and Distribution										
Wastewater					●					
Cheyenne Treatment Capacity					●					
Pine Bluffs Treatment Capacity										
F.E. Warren/Cheyenne Sewers					●					
Solid Waste					○					
Cheyenne Collection/Compaction Equipment					○					
All Other Communities										
Stormwater										
Cheyenne Urban Area Sewers										
All Other Communities										
Telephone Service										
F.E. Warren AFB				○	○					
Cheyenne Residential Service										
All Other Communities										

FIGURE 3.1.7-1 UTILITIES SUMMARY IMPACT MATRIX

immediately. If that is not the case, the project will worsen the already overloaded treatment capacity at South Cheyenne and add more flow to the Dry Creek plant, which, by virtue of receiving more and more flow from Crow Creek, will be reaching its current capacity as well. There is no question but that implementation of the 201 Plan which is already needed for baseline conditions, will involve a high impact on the local community, even with funding support from the state and federal governments. But it is worth noting that local officials are eager to proceed with the indicated improvements, despite the local funding impacts, and they anxiously await final funding approvals and the beginning of necessary construction.

#### **3.1.7.5.2      Aggregation of Elements, Impacts, and Significance**

Figure 3.0-1 presented the aggregation of impacts for utilities as a whole. The aggregated rating for utilities overall is: low and significant impacts at the local level for the short term. No regional short or long-term impacts on utilities will occur.

This overall rating has been reached through a professionally judged, qualitative averaging of the element and subelement ratings given in Figure 3.1.7-1. The short-term site impacts are rated negligible but not significant because most elements were not affected at the site level. The local-level impacts were rated low because many utilities subelements had low ratings and significant because Cheyenne's wastewater situation and early implementation of the 201 Facilities Plan are so highly critical.

Cheyenne Urban Area impacts are generally higher and often more significant than the impacts for all other communities. Site-level impacts for the Cheyenne Urban Area are considered low but not significant. The local-level impacts are low but significant, again because the significant rating for wastewater dominated the others. No other impacts are applicable except for the long-term local impacts which are negligible.

For all other communities there are only local impacts which are rated negligible and not significant.

The cable and road-siting alternatives to the Proposed Action do not impact the utilities in urban areas, and the dispatch station alternatives involve so few people that their impacts are all negligible and not significant.

#### **3.1.7.6      Mitigation Measures**

Potential mitigation measures that will be considered are identified below. One, some, or all of the mitigation measures may ultimately be selected. Each measure identifies the party responsible to implement, but not necessarily to pay for, the measure.

- o    The expedited implementation of the existing 201 Facilities Plan to provide reliable wastewater capacity for South Cheyenne. This mitigation measure will be effective in providing all the necessary treatment capacity needed for both baseline and project-related growth, and, if selected (as is locally anticipated), should be implemented by September 1985. The responsible agencies for implementing the mitigation measure are the agencies who submitted the 201 Facilities Plan: the City of Cheyenne (Board of Public Utilities), Laramie County (Cheyenne-Laramie County Regional Planning Office), and the South Cheyenne Water & Sewer District.
- o    The replacement with 15-inch pipe of certain sections of 12-inch sanitary sewer in Cheyenne which periodically surcharge as a result of high flows of wastewater into these pipes from upstream sewers on F.E. Warren AFB. This mitigation measure will

be effective in stopping the periodic flooding of streets and basements, and if selected, should be implemented by September 1985. The responsible agency for implementing this mitigation measure is the Cheyenne Board of Public Utilities.

- o The purchase of a garbage truck and a landfill compactor in 1986 (instead of 1987 and 1988, as required for baseline growth) for use by the City of Cheyenne. This mitigation measure will be effective in avoiding the borrowing of equipment from other city agencies after loads of solid waste reach 200 tons per day, and if selected, should be implemented by June 1986. The responsible agencies for implementing this mitigation measure are the City of Cheyenne's Department of Sanitation and the Department of Public Works, Division of Streets and Alleys.

#### 3.1.7.7 Unavoidable Adverse Impacts

There will be no unavoidable adverse utilities impacts from the Proposed Action.

#### 3.1.7.8 Irreversible and Irretrievable Resource Commitments

The aggregate sand and cement associated with less than 4,000 feet of 15-inch concrete sanitary sewer and the roughly 4,500 feet of storm sewers ranging from 15 to 48 inches in diameter are the only resources to be irretrievably dedicated.

#### 3.1.7.9 The Relationship Between Local Short-Term Use of Man's Environment and Maintenance and Enhancement of Long-Term Productivity

The mitigations suggested for utilities all involve the burial of new pipelines and telephone cable or the expansion of treatment capacity on already dedicated land. Hence, while the installation of new buried utilities will involve very short-term disturbances of the environment, these facilities will enhance man's ability to use his environment since they involve fixing existing problems with capacity that will accommodate all present and foreseeable future needs.



### **3.1.8      Energy Resources**

#### **3.1.8.1    Introduction**

This section presents a quantitative comparison of energy demands projected with and without the project. Project energy demands are calculated in terms of resources needed to construct and operate the project (direct impacts), and induced energy demands exerted by people moving into the Region of Influence because of the project (indirect impacts). Specifically, this section will examine the impacts of the proposed project on electrical power, natural gas, petroleum products, and coal. A number of energy resources are nonrenewable; that is, the consumption of the resource effectively means the depletion of the remaining recoverable reserves of that resource. Nonrenewable resources include natural gas, petroleum fuels, and coal. Depletion of nonrenewable resources is a national concern and is specifically examined in this section.

As discussed in Section 2.1.8.1, energy impacts within the Region of Influence, with the possible exception of petroleum products, are likely to be concentrated within relatively few locations. The rationale for selection of these Areas of Concentrated Study is based upon a preliminary comparison of peak-year induced energy demands with known 1982 demands for each town or city where socioeconomic analysis indicates immigration due to the project. In virtually every case, baseline energy demands are projected to be higher than 1982 levels. Therefore, comparison of project-induced consumption with 1982 consumption levels is a conservative approach for selecting the Area of Concentrated Study.

Cheyenne is projected to receive the greatest amount of project-induced population influx (more than 2,600 in 1987). This community is therefore carried forward for detailed analysis for all four energy categories. Other communities which will be a part of the Area of Concentrated Study analyzed in Section 3.1.8.4 are shown in Table 3.1.8-1. In addition, any area which will supply energy for project construction or operation is included within the Area of Concentrated Study. This specifically includes the service areas of the three rural electric associations which supply electricity to 96 of the 100 Launch Facilities in the Deployment Area. The Area of Concentrated Study for gasoline and diesel was determined in a different manner. It is probable that construction contractors will draw their bulk fuel requirements from local wholesalers in the larger towns such as Cheyenne or Scottsbluff. However, many of the smaller construction vehicles and workers who commute through the Deployment Area will refuel at gasoline service stations over a wide area in and around the Deployment Area. Therefore, the five-county Deployment Area (Cheyenne, Platte, and Goshen counties, Wyoming, and Banner and Kimball counties, Nebraska) plus Scotts Bluff, Nebraska are selected as the Area of Concentrated Study for petroleum products. The information in this section is based upon data and detailed analysis contained in the Energy Resources Environmental Planning Technical Report.

Table 3.1.8-1

**COMPARISON OF PEAK INDUCED ENERGY DEMANDS WITH 1982  
DEMAND BY COMMUNITY**  
(Expressed as Percentage Increases)

	<b>Electricity Consumption</b>	<b>Peak Electrical Demand</b>	<b>Natural Gas</b>
<u>Wyoming</u>			
Cheyenne	<u>1.4<sup>a</sup></u>	<u>1.6</u>	<u>1.1</u>
Pine Bluffs	<u>4.8</u>	<u>4.7</u>	<u>9.3</u>
Chugwater	<u>2.5</u>	<u>1.7</u>	N/A
Torrington	<u>1.0</u>	<u>1.2</u>	<u>2.4</u>
Wheatland	<u>4.2</u>	<u>4.5</u>	<u>6.8</u>
<u>Nebraska</u>			
Kimball	<u>3.5</u>	<u>3.6</u>	<u>4.8</u>
Gering	<u>0.5</u>	<u>0.3</u>	<u>1.0</u>
Scottsbluff	0.4	0.4	0.9

<sup>a</sup> The underlined values within a column indicate the Area of Concentrated Study for that energy category.

N/A Not applicable

### 3.1.8.2 Definition of Levels of Impact

The levels of impact for the energy categories are defined as follows:

- o Negligible Impact - No appreciable increase in energy demand will be caused by the project. Price and reliability of the energy resource are unaffected. No depletion of nonrenewable energy resources will result from the project.
- o Low Impact - An increase in demand will be caused by the project. However, existing and planned facilities and/or suppliers will be adequate to handle the increase. The cost of the resource might rise, but by such a small amount that the increase will be imperceptible to the average consumer. Reliability of service will be unaffected. Only a minor depletion of nonrenewable energy resources will result.
- o Moderate Impact - The increase in energy demand resulting from the project will cause one or more of the following: the construction of minor new facilities such as additional local transmission lines, small electric transformer sites, local extensions of gas mains, or sizable increases in demand upon local private distributors of diesel and gasoline; price increases large enough to be noticeable by the average consumer, but without predictable economic hardship; or deterioration in service reliability over the long term or periodic interruptions of service. With regard to depletion of nonrenewable energy resources, the depletion is of a magnitude that might spur additional regional energy development.

- o High Impact - The increase in energy demand resulting from the project will cause one or more of the following: the increase in energy demand will exceed the planned capability of a regional, wholesale supplier to provide the energy; a need for major new facilities by the local utility to generate or distribute the additional energy (e.g., large electrical generators, high voltage transmission lines, major new gas mains, or major storage and distribution equipment for fuel suppliers); an increase in energy price, resulting in hardships to low-income persons or a reduction in energy-dependent economic activities; or substantial service deterioration or frequent interruptions of service. With regard to nonrenewable energy resources, a major depletion would result. The energy resource depletion would be of a magnitude that would necessitate a substantial increase in regional energy development and/or the substitution of alternative energy sources.

### 3.1.8.3 Determination of Significance Criteria

An impact is considered significant if it affects public health or safety; if it threatens federal, state, or local laws or requirements imposed for the protection of the environment; if institutional responses to the impact will be extensive; or if the impacts to the resource user are (in the judgment of the analyst) of such intensity or geographic coverage as to adversely affect the quality of life in the region or greatly reduce the availability of that resource. The rationale for this judgment will be explicitly described.

### 3.1.8.4 Assumptions, Assumed Mitigations, and Environmental Impacts of the Proposed Action and Project Alternatives

Baseline growth data (e.g., growth in the absence of the project) in electrical consumption and demand for the rural electric associations and Cheyenne Light, Fuel and Power Company were obtained from reports filed with the Wyoming Public Service Commission. For the remaining town electric utilities, utility-supplied growth estimates were used. Project-induced demand due to immigration was estimated by multiplying the calculated new residences by the appropriate average residential consumption figure (Table 2.1.8-2). Using Cheyenne Light, Fuel and Power Company's experience, peak demand was estimated by multiplying induced population by 0.5 kilowatt (kW) per person.

To calculate potential cost impacts to Cheyenne Light, Fuel and Power Company's customers, the ratchet charges contained in the wholesale electrical contract with Pacific Power and Light Company (lasting through 1989) were used.

Baseline natural gas projections were obtained from Cheyenne Light, Fuel and Power Company. Specific projections do not exist for the service areas of Kimball, Torrington, and Wheatland. These towns are all served by Kansas/Nebraska Natural Gas Company which projects an average annual increase in natural gas consumption of 3 percent per year for the towns; 1982 consumption levels were therefore increased by this amount annually through 1990. Pine Bluffs also had no official natural gas forecasts. Data for the past 5 years indicated no growth pattern in consumption. Therefore only a 1-percent annual growth rate was projected for this analysis. Estimates of project-induced consumption were calculated on the basis of increases in the number of residences, by year, similar to electricity. Mean, annual residential consumption values for each community (Table 2.1.8-3) were then applied to derive induced gas usage.

The increase in natural gas at F.E. Warren AFB was calculated from heat load data on new buildings in the Stage Storage Area to be heated by natural gas. A conversion factor of 1 cubic foot (cf) of natural gas per 1,020 British thermal units (Btu) was used. A gas furnace efficiency factor of 0.85 was assumed.

Projections of passenger vehicle miles traveled in the Area of Concentrated Study (by county) were available from the transportation study performed for this EIS. Vehicular mileage was divided by national auto fuel efficiency factors for the years of interest to obtain estimates of gasoline consumed. The fraction of diesel-powered passenger cars was also taken into account in these calculations. Diesel fuel projections were developed by applying per capita use factors to population projections for the six-county Area of Concentrated Study.

Total petroleum product requirements associated with project construction were estimated using standard construction planning techniques. Gasoline and diesel fuel breakdowns were derived by assuming construction at F.E. Warren AFB will require a 25 percent diesel and a 75 percent gasoline split. Construction in the Deployment Area was assumed to require a 75 percent diesel and a 25 percent gasoline split.

There will be no indirect or construction requirements for coal. Data on long-term operational use of coal at F.E. Warren AFB was calculated based upon facility-specific heat loads and an assumed hot water plant efficiency of 75 percent.

Assumptions. A number of assumptions have been made in the assessment of energy impacts. These are summarized as follows:

- o Western Area Power Administration will supply the increased operational electrical needs at F.E. Warren AFB following construction at the base.
- o Current (1982) per capita consumption rates were assumed to remain constant over the entire construction and deployment period. In light of recently declining consumption rates, this is a conservative assumption.
- o All additional energy demand will be met through the existing energy infrastructure and from conventional energy sources.
- o Since socioeconomic analysis projects that immigrants will be living in towns or cities in the Region of Influence, it is assumed that indirect energy needs in the rural areas as a result of the project will be negligible.
- o All indirect electrical demand in the Cheyenne area due to the project will be supplied under the ratchet charge portion of Cheyenne Light, Fuel and Power Company's contract with Pacific Power and Light Company. This is a worst-case assumption in terms of potential price impact to the local consumer.
- o Adequate petroleum products will be available at the regional and national level through 1990.

Assumed Mitigations. In analyzing energy impacts, the following mitigation measures are assumed during and following the construction period:

- o Energy planning will be coordinated with local and/or regional suppliers to ensure a timely and efficient energy supply.

- o Air Force energy conservation design requirements will be incorporated into all new buildings.
- o Onbase electrical needs for construction will be drawn from existing base electrical facilities. Construction electrical requirements will therefore be furnished directly through one or more regional suppliers. Bulk fuel requirements will be supplied by local wholesalers.
- o In digging and laying the buried communication cables, special care will be taken to avoid damage or interruption to buried energy pipelines. The cable will be buried a minimum of 36 inches below the bottom of all existing pipelines.
- o The upgrading of the Western Area Power Administration electrical substation required to meet future demand of F.E. Warren AFB will be accomplished as part of the proposed project.
- o In the Deployment Area, where temporary construction requirements for electricity exceed the capacity of the local commercial powerline supply, mobile electric generators will be used.

Environmental Impacts. Environmental impacts of the Proposed Action and project alternatives are discussed in the following subsections.

#### 3.1.8.4.1 Electrical Power

##### 3.1.8.4.1.1 Baseline Future - No Action Alternative

Table 3.1.8-2 shows the baseline increases in electrical consumption projected for the communities of the Area of Concentrated Study. Between 1983 and 1990, consumption in the Cheyenne Light, Fuel and Power Company service area will increase 19 percent to nearly 600,000 megawatt hours (MWh). Ratchet charges are already potentially in effect for wholesale purchases, although Cheyenne is currently avoiding such charges by purchasing nonfirm power from the Western Area Power Administration. The only major expansion plans involve a project which will double the capacity of the south side substation and associated feeder line.

Kimball is projected to experience a 15-percent increase in electrical consumption, approaching 21,000 MWh in 1990. Scheduled system improvements consist of a new 10,000-kilovolt ampere (kVA) substation on the south side of the town and 6 miles of high voltage (115 kV) powerline. Neither power utility foresees any difficulty in adequately serving projected growth.

Wheatland and Pine Bluffs are forecast to experience a greater than 20-percent increase in electrical consumption by the early 1990s. The peak demand at Wheatland will exceed 6 megawatt (MW) while that of Pine Bluffs will reach 2.4 MW. The Chugwater substation will experience increases on the order of 7 percent if present trends hold. The only major system improvement in the three areas will be for Pine Bluffs. The capacity of the substation there will be doubled to 3,750 kVA.

Electrical use at F.E. Warren AFB and in the Deployment Area is not projected to increase substantially in the absence of the proposed project.

Table 3.1.8-2

## ELECTRICAL USE PROJECTIONS FOR THE COMMUNITIES IN THE AREA OF CONCENTRATED STUDY

	1983	1984	1985	1986	1987	1988	1989	1990
<u>Cheyenne LF&amp;P</u>								
Baseline Consumption <sup>1</sup>	503,000	518,000	533,000	547,000	559,000	572,000	584,000	596,000
Percent Increase <sup>2</sup>		(0.1)	(0.5)	(0.9)	(0.9)	(0.8)	(0.8)	(0.4)
Baseline Load <sup>3</sup>	86	89	91	94	96	98	100	102
Percent Increase <sup>2</sup>		(0.2)	(0.4)	(1.3)	(1.4)	(1.3)	(1.2)	(0.6)
<u>Kimball</u>								
Baseline Consumption <sup>1</sup>	18,119	18,481	18,850	19,227	19,612	20,004	20,404	20,812
Percent Increase <sup>2</sup>					(1.5)	(0.8)	(3.3)	(0)
Baseline Load <sup>3</sup>	4.10	4.18	4.27	4.75	4.44	4.53	4.62	4.71
Percent Increase <sup>2</sup>					(0.8)	(0.8)	(3.2)	(0)
<u>Wheatland</u>								
Baseline Consumption <sup>1</sup>	26,500	27,300	28,100	28,900	29,800	30,700	31,600	32,600
Percent Increase <sup>2</sup>			(2.8)	(4.0)	(2.0)	(0)		
Baseline Load <sup>3</sup>	5.03	5.79	5.34	5.51	5.67	5.84	6.02	6.20
Percent Increase <sup>2</sup>			(2.1)	(4.3)	(1.8)	(0)		
<u>Chugwater Substation<sup>4</sup></u>								
Baseline Consumption <sup>1</sup>	8,188	8,270	8,353	8,437	8,521	8,606	8,692	8,777
Percent Increase <sup>2</sup>			(1.6)	(1.6)	(1.5)	(0)		
Baseline Load <sup>3</sup>	1.49	1.51	1.52	1.54	1.55	1.57	1.58	1.60
Percent Increase <sup>2</sup>			(1.6)	(1.6)	(1.6)	(0)		

Table 3.1.8-2 Continued, page 2 of 2  
ELECTRICAL USE PROJECTIONS

	1983	1984	1985	1986	1987	1988	1989	1990
<u>Pine Bluffs</u>								
Baseline Consumption <sup>1</sup>	9,600	10,000	10,400	10,600	11,200	11,700	12,100	12,600
Percent Increase <sup>2</sup>			(1.0)	(0)	(3.1)	(0)		
Baseline Load <sup>3</sup>	1.82	1.90	1.97	2.02	2.13	2.22	2.30	2.40
Percent Increase <sup>2</sup>			(0.6)	(0)	(3.5)	(0)		

1 Baseline consumption without project (MWh)

2 Percent increase induced by project (in parentheses)

3 Baseline load without project (MW)

4 Electricity supplied by the Wheatland Rural Electric Association

#### 3.1.8.4.1.2 Proposed Action

Table 3.1.8-2 shows the incremental increases in electrical usage in the five communities studied. The highest percentage increase will be experienced by the Wheatland system. In 1986, project-induced peak electrical demands will be more than 4 percent over baseline. All electric systems have ample capacity to meet project-induced needs. The towns of Wheatland, Pine Bluffs, and Kimball have served the electrical needs of large worker populations in the past and still retain the local distribution system to service the projected immigrants. The number of immigrants projected for Chugwater is low. Its substation is currently only 45 percent loaded and retains ample capacity to meet project-induced needs.

The peak load for the Cheyenne Light, Fuel and Power Company system will increase by 1.2 to 1.4 percent during the years 1986 to 1989 as a result of the project. The Cheyenne Light, Fuel and Power Company wholesale supply contract with Pacific Power and Light contains provisions for ratchet charges when peak energy use exceeds a certain level. Under worst-case conditions, Cheyenne Light, Fuel and Power Company will need to purchase about \$200,000 of additional electricity in 1987 to meet project-induced needs. The ratchet effect will result in a per-unit cost increase for wholesale electrical power of about 0.4 percent. No major system upgrades will be needed in Cheyenne to handle project-induced growth. During the influx of relatively large numbers of new, project-induced customers, field service may deteriorate somewhat in all affected communities due to the higher number of new installations. This will only be a short-term condition.

Long-term operational use of electricity at F.E. Warren AFB is estimated to be 6.13 million kilowatt hours (kWh) and 2,230 kilowatt (kW) above current levels. These represent increases of 26 percent and 57 percent, respectively, over existing conditions. Due to the increased electrical load, the substation through which Western Area Power Administration power is supplied to the base will have to be expanded from the current 7,500 kVA to 10,000 to 12,000 kVA. This will be accomplished as part of the project. It is expected that Western Area Power Administration will continue to supply the operational electrical needs of the base.

Use of electricity for construction at each Launch Facility will be 15,000 kWh over a 2 to 3-month period. This will be about half of the consumption that occurs with an operational facility. The normal electronic and environmental equipment power loads will be disconnected during this period. Peak-construction power loads may exceed the capacity of the local transformer supplying the site for a short period of time. If this possibility arises, the contractor will be required to supply supplementary electrical power by use of a portable generator. Alternatively, he may make special arrangements with the local electrical utility. Operational electrical use at the modified silos will increase from 180 to 219 MWh per year (22%) while peak demand will increase from 25 to 32 kW.

Overall it is concluded that the change in electrical consumption associated with the project is low on the local level and very low at the regional level. Long-term usage at F.E. Warren AFB will increase substantially. Changes in consumer power rates (due to the project), if they occur at all, will be minimal and not noticeable to the rate payer. On the basis of the need for upgrading the electrical substation serving F.E. Warren AFB, the short-term local impact is judged to be moderate. The long-term local electrical impact is judged to be low. Regional impacts are judged to be negligible, both long and short term. None of the electrical impacts are considered to be significant.

None of the project element alternatives involves the use of appreciable amounts of electricity.



#### 3.1.8.4.2 Natural Gas

##### 3.1.8.4.2.1 Baseline Future - No Action Alternative

Baseline projections of natural gas consumption in the Area of Concentrated Study are shown in Table 3.1.8-3. The two major purveyors, Cheyenne Light, Fuel and Power Company and Kansas/Nebraska Natural Gas Company, Inc. foresee no difficulty in providing natural gas to meet future customer needs either in terms of supply or pipeline capacity (Cheyenne Light, Fuel and Power Company 1983, Kansas/Nebraska Natural Gas Company, Inc. 1983). Cheyenne Light, Fuel and Power Company recently lost a major industrial consumer, Wycon, a manufacturer of nitrogen fertilizers. The 6,000 million cubic feet (MMCF) of gas used by Wycon represented a 45-percent drop in natural gas sales for Cheyenne Light, Fuel and Power Company. Baseline growth through 1990 will recoup only 10 percent of this. Thus, Cheyenne Light, Fuel and Power Company possesses a considerable surplus capability for delivery of natural gas to Cheyenne for other uses.

##### 3.1.8.4.2.2 Proposed Action

A comparison of the indirect consumption values with the baseline figures for peak project years (Table 3.1.8-3) indicates that increased natural gas consumption induced by the project will boost baseline consumption by a maximum ranging from 1.1 percent in Cheyenne to 8.8 percent in Pine Bluffs. The communities of Pine Bluffs, Wheatland, and Kimball have supported large populations of temporary workers in the past and have the natural gas infrastructure in place to serve the project-induced needs. Both Cheyenne Fuel, Light and Power Company and Kansas/Nebraska Natural Gas Company, Inc. indicate that the projected immigrants can be readily served. Regional and national events (as opposed to local demand) have tended to be the dominant factors in determining the price of natural gas in recent years. This trend is likely to continue into the future. Both of the natural gas distributors in the Area of Concentrated Study reported that local demand levels will not affect the consumer rate structure.

There will be no natural gas requirements for project construction. The only increase in operational gas usage will be to heat six buildings in the new Stage Storage Area at F.E. Warren AFB. It is calculated that an additional 2,500 thousand cubic feet (MCF) of gas will be used (the equivalent of 18 new residences in Cheyenne). This represents a 0.6-percent increase in base usage of natural gas.

The short-term impact of the project upon natural gas is concluded to be low locally and negligible on a regional basis. Long-term requirements for additional natural gas are less than short-term requirements and the level of impact is concluded to be the same: low on the local level and negligible on the regional level. None of the natural gas impacts are considered to be significant.

None of the project element alternatives involve the use of natural gas.

#### 3.1.8.4.3 Petroleum Products

##### 3.1.8.4.3.1 Baseline Future - No Action Alternative

Baseline gasoline and diesel consumption for passenger vehicles in the Area of Concentrated Study is shown in Table 3.1.8-4. The effect of increasing fuel efficiency in the American auto fleet can be seen in the decreasing amount of gasoline projected to be consumed. The Area of Concentrated Study contains a well-developed system of local fuel distributors and retailers

Table 3.1.8-3

## NATURAL GAS USE PROJECTIONS IN THE AREA OF CONCENTRATED STUDY

	1983	1984	1985	1986	1987	1988	1989	1990
Cheyenne LF&P <sup>1</sup> (MMCF) <sup>2</sup>	7,220	7,300	7,390	7,480	7,570	7,660	7,740	7,810
Percent Increase <sup>3</sup>		(0.2)	(0.7)	(1.1)	(1.1)	(1.0)	(1.0)	(0.5)
Kimball (MMCF)	288	297	306	315	324	334	344	355
Percent Increase					(1.8)	(2.6)	(3.9)	(0.0)
Pine Bluffs (MMCF)	81	82	83	84	84	85	86	87
Percent Increase				(2.1)	(0.0)	(8.8)	(0.0)	(0.0)
Wheatland (MMCF)	323	333	343	353	364	375	386	398
Percent Increase			(4.3)	(6.1)	(2.9)	(0.0)	(0.0)	(0.0)
Torrington (MMCF)	400	412	425	438	451	464	478	493
Percent Increase					(2.0)	(0.0)	(0.0)	(0.0)

1 Cheyenne Light, Fuel and Power Company

2 Baseline consumption without project

3 Percent increase induced by project (in parentheses).

(i.e., gas service stations) operating in a competitive, free-market system. This assures an adequate level of gasoline supply at the local level as long as regional and national supplies are available to meet demand. This appears to be the case for the foreseeable future.

Existing fuel use at F.E. Warren AFB (including Deployment Area use) was 79,000 gallons of diesel and 729,000 gallons of gasoline in 1982 and will continue at or slightly below these levels into the future. These fuels are purchased from a local distributor who buys from regional sources.

#### 3.1.8.4.3.2 Proposed Action

Table 3.1.8-4 shows the percentage increase in gasoline and diesel use due to the combined requirements of direct and indirect use in the six-county Area of Concentrated Study. Peak-year consumption will occur in the years 1985 to 1987. During that period, gasoline consumption attributable to the project will result in a 3-percent rise in demand. Peak diesel use induced by the project is 1.4 million gallons (MG) in 1986. This represents a 6-percent increase over baseline conditions.

With regard to the Defense Access Road surfacing options, Option B, the full paving option, will consume 2.8 MG of diesel fuel. This represents a low, not significant impact upon the regional fuel system.

Table 3.1.8-4

#### PASSENGER VEHICLE GASOLINE AND DIESEL USE PROJECTIONS IN THE AREA OF CONCENTRATED STUDY<sup>1</sup>

	1983	1986	1987	1990
<u>Gasoline</u>				
Baseline Consumption				
(10 <sup>6</sup> Gallons)	70	64	61	56
Percent Increase <sup>2</sup>	(0.0)	(3.1)	(3.0)	(0.8)
<u>Diesel</u>				
Baseline Consumption				
(10 <sup>6</sup> Gallons)	22	23	24	25
Percent Increase	(0.0)	(6)	(5)	(0.4)

<sup>1</sup> The Area of Concentrated Study includes the counties of Laramie, Platte, Goshen, Banner, Kimball, and Scotts Bluff.

<sup>2</sup> Percent increase induced by project (in parentheses).

The only substantial change in operational fuel use following construction will be an increase in the number of roundtrips by the large stage transporter and associated emplacer needed for periodic missile replacement. This is estimated to increase annual diesel fuel need by about 17,000 gallons, a 22-percent increase over existing operations.

There will be an increase of 3 to 6 percent in local demand for gasoline and diesel in the Area of Concentrated Study during the project. The local, short-term impact to petroleum products is therefore judged to be low. Long-term local impacts will be low. Impact to the regional supply system will be negligible over both the short and long term. None of the impacts will be significant.

Fuel requirements for the project element alternatives are a relatively small portion of total project construction fuel requirements. Impacts are rated as low and not significant with the exception of buried cable route PA1 whose impact is negligible due to its substantially shorter length.

#### 3.1.8.4.4 Coal

##### 3.1.8.4.4.1 Baseline Future - No Action Alternative

No substantial, additional use of coal at F.E. Warren AFB is forecast to occur in the future.

##### 3.1.8.4.4.2 Proposed Action

No indirect use of coal will result from project-induced immigration. No coal requirements have been identified for project construction. Following construction at F.E. Warren AFB, coal heating requirements will increase due to approximately 290,000 square feet (sq ft) of additional coal-heated building space, according to heating load estimates. The present estimate is that this will result in the burning of an additional 1,300 tons of coal annually, a 12-percent increase over existing coal use at the base heating plant. Given the existing rail delivery facilities adjacent to the plant, local, long-term impact is judged to be low. Short-term local impact and both short and long-term regional impact to the coal distribution system will be negligible. None of the impacts will be significant. None of the project element alternatives involves the use of coal.

#### 3.1.8.5 Summary of Impacts

##### 3.1.8.5.1 Explanation of Detailed Impact Matrix

Figure 3.1.8-1 summarizes the Proposed Action impact assessments for each of the four energy categories. There are four possible levels of impact, ranging from negligible to high. Their definitions can be found in Section 3.1.8.2. Site-specific energy impacts are not considered generally applicable because energy supply and distribution systems are organized at the local and regional level and it is at these latter two levels that energy impacts will be felt.

The short-term impacts of the proposed project upon the energy elements (electricity, natural gas, petroleum products, and coal) are with one exception negligible to low. The short-term local impact upon the electrical distribution system was found to be moderate due to the need to expand the capacity of the Western Area Power Administration electrical substation to meet the increased electrical demand of F.E. Warren AFB. All long-term impacts were found to be negligible to low. All impacts were judged to be not significant.

Because of the highly developed regional energy distribution system, energy resource depletion is only considered potentially significant at the regional level. In no category does project-related energy consumption account for more than a fraction of 1 percent of the regional supply capacity. The project will not deplete energy reserves to the extent that further regional energy development is necessitated. Thus overall impact to the nonrenewable


LEGEND		ADVERSE IMPACTS	SIGNIFICANT ADVERSE IMPACTS	PROJECT IMPACTS					
LEVEL OF IMPACT *	LOW	○	●	SHORT TERM			LONG TERM		
	MODERATE	○	●	SITE	LOCAL	REGIONAL	SITE	LOCAL	REGIONAL
	HIGH	○	●						
POTENTIAL BENEFICIAL EFFECTS									
* MEASURE OF THE AMOUNT OF ENVIRONMENTAL CHANGE									
ENERGY RESOURCES					○			○	
Electricity					○			○	
Natural Gas					○			○	
Petroleum Products					○			○	
Coal								○	
Depletion of Nonrenewable Energy Resources						○			○

FIGURE 3.1.8-1 ENERGY RESOURCES SUMMARY  
IMPACT MATRIX

resource base is concluded to be low and not significant over both the long and short term. None of the impacts shown in Figure 3.1.8-1 meet the significance criteria outlined in Section 3.1.8.3.

Figure 3.0-2 compares the energy impact, from a total project perspective, of each of the project element alternatives. The low, not significant impact derives from the fuel requirements for the base road access and the buried cable alternatives. The staging area alternatives will have negligible energy impact. With one exception (Cable Route PA1 which has negligible fuel impact), no distinction can be made among the alternatives in terms of project-wide changes in energy use.

#### 3.1.8.5.2 Aggregation of Elements, Impacts, and Significance

Overall impact of the proposed project upon energy resources is low and not significant for the short term, and negligible for the long term.

In order to determine the overall energy resource level of impact, a composite impact level was selected based upon professional judgment. Since the majority of short and long-term local energy impacts are low to negligible, the resultant overall short-term impact to energy is low at the local level over the short and long term. A similar procedure was used to conclude that regional energy impacts will be negligible over the short and long term. None of the impacts are judged to be significant.

#### 3.1.8.6 Mitigation Measures

Identified below are potential mitigation measures that will be considered to assure that the project results in a minimum demand on energy resources. One, some, or all of the mitigation measures may ultimately be selected. Each measure identifies the party responsible to implement, but not necessarily to pay for, the measure.

- o Diesel fuel savings can be realized by operating the Peacekeeper stage transporter and support equipment to minimize the number of roundtrips needed to replace a missile. The substitution of smaller transporter vehicles, where practical, coupled with operational practices which minimize the number of roundtrips required of the stage transporter can minimize the amount of fuel consumed during yearly operations. This measure should be implemented at the start of the full system operation in late 1989. Earlier implementation would result in less fuel consumed during the Peacekeeper deployment period. This measure will not affect the level of energy impact of the project. The responsible agency for implementing this mitigation measure is the Air Force.
- o Provide project-related employees incentives for using high occupancy vehicles such as van pools or car pools. This mitigation will be effective in reducing the project-related traffic increase (and the attendant fuel consumption) and, if selected, should be implemented throughout the construction phase of the project. The responsible agency for implementing this mitigation measure is the Air Force and its contractors.

#### 3.1.8.7 Unavoidable Adverse Impacts

The only unavoidable adverse energy impact will be the consumption of nonrenewable energy resources to construct and operate the project. This energy usage will not cause shortages elsewhere.

#### 3.1.8.8 Irreversible and Irretrievable Resource Commitments

Direct project energy requirements for construction and operation represent the only irreversible and irretrievable commitment of energy resources required for the project.

#### 3.1.8.9 The Relationship Between Local Short-Term Use of Man's Environment and Maintenance and Enhancement of Long-Term Productivity

The quantities of energy required for project construction and operation are quite small in a regional and national context. The use of these resources now will not materially affect their availability for future use. No energy development or use options are foreclosed by the project.

### **3.1.9      Transportation**

#### **3.1.9.1    Introduction**

This section describes the impacts of the Proposed Action and project-element alternatives on roads, railroads, aviation, public transit, and on pedestrian and bicycle facilities. A description of the criteria used to classify impacts, the criterion used to determine the significance of these impacts, and a description of the procedures used to estimate impacts are contained in the following sections.

In order to maximize the assessment process, data collection and analysis efforts focused on a smaller area of study within the Region of Influence where impacts were projected to be concentrated. This Area of Concentrated Study for transportation is defined as an area approximately bounded by Interstate 25, U.S. 26, Nebraska State Highway 71, Interstate 80, and portions of Kimball County, Nebraska, and Laramie County, Wyoming, south of Interstate 80. This area was based on the location of F.E. Warren AFB and the Peacekeeper in Minuteman Silos project. This area also focuses attention on those portions of the Region of Influence where project-induced population growth is anticipated since transportation systems in these areas would also be more directly affected by the project.

The information in this section is based upon data and detailed analysis contained in the Transportation Environmental Planning Technical Report.

#### **3.1.9.2    Definition of Levels of Impact**

The basic objective of a transportation facility is to accommodate a quantity of traffic demand with an acceptable quality of service. Additional project-related traffic demand would have an impact on the quality of transportation service. Levels of impact are defined below for each of the transportation elements.

##### **3.1.9.2.1    Roads**

For roads, the levels of impacts are measured primarily by changes in the traffic level of service and the physical condition of the roadway system. Also considered are the amount of delay, length of queues, and vehicular safety. Criteria for rural and urban systems are provided where appropriate.

##### **3.1.9.2.1.1    Level of Service**

The measure of quality of service is a function of the ratio of the rate of flow to the capacity of the transportation facility. The level of service concept defines this function and generally describes the operating conditions a driver may experience while traveling on a particular roadway. Level of service on a particular roadway varies primarily with volume. Table 3.1.9-1 shows a range from level A (best) to level F (worst).



**Table 3.1.9-1**  
**LEVEL OF SERVICE FOR ROADS**

- 
- |          |  |
|----------|--|
| <b>A</b> | <b>Free flow with low volumes and high speeds.</b>   |
| <b>B</b> | <b>Stable flow with operating speeds beginning to be restricted somewhat by traffic conditions.</b>  |
| <b>C</b> | <b>Stable flow, but speeds and maneuverability are more closely controlled by high volumes.</b>  |
| <b>D</b> | <b>Approaches unstable flow with tolerable operating speeds being maintained though considerably affected by changes in operating conditions.</b>  |
| <b>E</b> | <b>Unstable flow with speeds lower than in level D and volumes at or near maximum possible capacity. Possible stoppages of momentary duration.</b>   |
| <b>F</b> | <b>Forced flow with low speeds and volume below maximum capacity resulting from queues of vehicles backing up from a restriction downstream. Possible stoppages for short or long periods of time.</b> |
- 

**Source:** 1965 Highway Capacity Manual.

**Levels of impact for level of service are characterized as follows:**

- o **Negligible Impact** – Will result in no change in level of service for categories A, B, or C. Although actual traffic volumes may increase, the motorist will perceive no difference in traffic operations.
- o **Low Impact** – Will result in level of service category changes from A to B, or B to C; but no changes in level of service categories D, E, or F. The motorist might perceive a slight change in traffic.
- o **Moderate Impact** – Will result in level of service category changes from A to C, C to D, D to E, or E to F. The motorist will perceive a noticeable decrease in the quality of service in traffic operations.
- o **High Impact** – Will result in level of service category changes from A to D, A to E, A to F, B to D, B to E, B to F, C to E, C to F, and D to F. The motorist will perceive a drastic decrease in quality of service in traffic operations.

#### 3.1.9.2.1.2 Physical Conditions

The levels of impact for physical conditions are as follows:

- o Negligible Impact - Will result in no change in existing roadway conditions.
- o Low Impact - Will result in minimum change in existing roadway conditions involving minor deterioration, which will be corrected during routine maintenance. Motorists might perceive a slight decrease in roadway conditions.
- o Moderate Impact - Will result in a noticeable change in existing roadway conditions requiring site-specific repairs or maintenance due to deterioration.
- o High Impact - Will result in a severe change in existing roadway conditions, requiring extensive reconstruction or a substantial increase in the overall maintenance cycle.

#### 3.1.9.2.1.3 Queues

The levels of impact for queues are as follows:

- o Negligible Impact - Will result in no change from projected baseline length of queues.
- o Low Impact - Will result in an increase from projected baseline length of queues. Vehicles will pass through signalized intersections within one cycle length (a complete change in signal indications from red to green to yellow to red).
- o Moderate Impact - Will result in an increase from projected baseline length of queues. Vehicles will pass through signalized intersections within two cycle lengths.
- o High Impact - Will result in an increase from projected baseline length of queues. Vehicles will pass through signalized intersections in two or more cycle lengths.

*In a rural situation queues are a function of the speed of traffic (covered by delays) and are not based on signalized intersections as in an urban setting.*

#### 3.1.9.2.1.4 Delay (Urban)

In an urban situation, the levels of impact for delay are as follows:

- o Negligible Impact - Will result in no increase in delay or total travel time from projected baseline.
- o Low Impact - Will result in an increase in delay from projected baseline. Motorists will begin to reduce the acceptable space, or gap, between cross traffic for entering a stream flow of traffic.
- o Moderate Impact - Will result in an increase in delay from projected baseline. Motorists will begin to reduce their gap acceptance and occasionally use alternate travel routes.

- o **High Impact** - Will result in an increase in delay from projected baseline. Motorists will find and use alternate travel routes.

#### 3.1.9.2.1.5 Delay (Rural)

In a rural situation, the levels of impact for delay are as follows:

- o **Negligible Impact** - Will result in no increase in delay or total travel time from projected baseline.
- o **Low Impact** - Will result in an increase in delay from projected baseline. Queues of vehicles will begin to form at speeds of the slowest vehicle in the stream.
- o **Moderate Impact** - Will result in an increase in delay from projected baseline. Queues of vehicles will begin to form and in some cases may result in the halting of traffic and use of alternate routes.
- o **High Impact** - Will result in an increase in delay from projected baseline. Motorists will be required to halt frequently and, where possible, take alternate routes.

Delays are taken as a function of flow rates (both ways), speed of travel, speed variance, and passing sight distance.

#### 3.1.9.2.1.6 Safety

The levels of impact for safety are as follows:

- o **Negligible Impact** - Will result in no change from projected baseline accidents.
- o **Low Impact** - Will result in a change from projected baseline accidents, involving minimal property damage (less than \$200), no injuries, and no loss of life.
- o **Moderate Impact** - Will result in a change from projected baseline accidents involving property damage over \$200, minor injuries, and no loss of life.
- o **High Impact** - Will result in a change from projected baseline accidents, involving property damage over \$200, major injuries, and/or loss of life.

The Manual on Uniform Traffic Control Devices (Federal Highway Administration 1978) recognizes an accident with property damage in the amount of at least \$100 important enough to be considered in the design warrants for traffic signal systems. However, the motor vehicle registries in various states require an accident with property damage of \$200 or more to be reported in writing by the vehicle owners. Therefore, this monetary amount formed the basis for assessing damage.

#### 3.1.9.2.2 Railroads

For railroads, the levels of impact are measured by changes in various aspects of transportation, such as frequency of service, number and capacity of trains, holding facilities and rail yards, and system of operations.

- o **Negligible Impact** - Change in projected baseline that will result in no increase in regular services and volumes.

- o Low Impact - Change in projected baseline that will require no additional manpower to handle additional freight with present schedules and physical facilities.
- o Moderate Impact - Change in projected baseline that will require additional manpower and modifications to system of operations to handle additional freight.
- o High Impact - Change in projected baseline that will require additional manpower and the use of all present capacity of holding facilities, rail yards, and other physical facilities to handle additional freight. Enlargement or relocation of facilities will be necessary.

#### 3.1.9.2.3 Aviation

For airports, the level of impact is measured by changes in air operations, safety, and land-side facilities.

- o Negligible Impact - Change in projected baseline that will cause no increases in airport operations or land-side volumes.
- o Low Impact - Change in projected baseline that will permit increased air operations to remain within limits of safety regulations and not appreciably change demand for land-side facilities.
- o Moderate Impact - Change in projected baseline that will require appreciable enlargement of airport land-side facilities, but air traffic operations will remain within safety limits.
- o High Impact - Change in projected baseline that will approach limits of air traffic operations safety, requiring changes in projected baseline operation procedures. Land-side facilities will approach capacity of any expansion at the present airport site.

#### 3.1.9.2.4 Public Transit

For local commuter bus transportation, quality of service is measured by scheduling, passenger comfort, and ease of travel. At some point, bus capacity can be exceeded and additional buses should be placed in service. Additional buses could offer a higher level of passenger comfort, but might have a slight adverse effect on overall traffic flow.

- o Negligible Impact - Change in projected baseline that will cause an increase in the number of passengers, but require no schedule modifications.
- o Low Impact - Change in projected baseline. All passengers will be seated but modifications to schedules will be required due to increased passengers.
- o Moderate Impact - Change in projected baseline. There will be standees at peak hours and schedule changes will be necessary.
- o High Impact - Change in projected baseline. Standees approach bus capacity and additional vehicles must be acquired.

For taxis, the level of impact is measured by response, travel time, and size of fleet.

- o **Negligible Impact** – Change in projected baseline that will cause no increase in response time or travel time.
- o **Low Impact** – Change in projected baseline that will cause minor increases in response and travel times.
- o **Moderate Impact** – Change in projected baseline that will cause noticeable increases in response and travel times; vehicles may be added to the fleet.
- o **High Impact** – Change in projected baseline that will increase response time beyond reasonable customer acceptable levels; vehicles will be added to the fleet.

#### **3.1.9.2.5      Pedestrian and Bicycle Facilities**

For pedestrians and bicyclists the level of impact is measured by the safety of the pedestrian or bicyclist, as defined in Section 3.1.9.2.1.6.

#### **3.1.9.3      Determination of Significance Criteria**

Once the level of impact is identified, the significance of the impact can be determined. Significance is a measure of the importance of an impact. It is a function of the interaction between level of impact and the context in which the impact occurs. Context represents the various qualitative conditions present in the existing environment which operate to magnify or diminish the importance of the impact. If one or more of the following conditions is present, the impact will be considered significant: whether the impact affects public safety, whether the impact is likely to be highly controversial, whether the action and its impact are related to other actions with individually insignificant but cumulatively significant impacts, and whether institutional responses to the impact will be extensive.

A more detailed rationale for determination of significance for each of the transportation criteria is presented here. As can be seen, they address the public safety and institutional conditions cited above.

##### **3.1.9.3.1      Roads**

An impact will be considered significant if one or more of the following conditions are present.

- o **Level of service** – A reduction in level of service will occur for more than 1 hour (an accepted criteria for analysis and design of roadway facilities) or the level of service will be reduced below minimum desirable design standards, generally accepted to be level C.
- o **Physical condition** – A decrease in existing roadway conditions will occur over an extended period requiring substantial physical improvements or substantially increased maintenance.
- o **Queues** – An increase in length of queues will occur for more than 1 hour (an accepted criteria for analysis and design of roadway facilities) or will begin to extend to adjacent intersections.
- o **Delay** – An increase in delay of more than 5 minutes (an accepted criteria for analysis) will occur or alternate travel routes will become congested.

- o **Safety** - An increase in number of accidents per year will occur and necessitate change of traffic control device or substantial geometric improvements.

#### **3.1.9.3.2      Railroads**

An impact will be considered significant if it could result in increased railroad traffic for a continuously extended period of time which will require substantial modification to facilities or could begin to affect train traffic beyond the project area.

#### **3.1.9.3.3      Aviation**

An impact will be considered significant if it could result in increased operations over a continuously extended period of time which require substantial physical improvements or cause violations in air operations safety regulations.

#### **3.1.9.3.4      Public Transit**

An impact will be considered significant if it could result in an appreciable increase in the number of passengers over a continuously extended period of time which will require additional vehicles.

#### **3.1.9.3.5      Pedestrian and Bicycle Facilities**

An impact will be considered significant if it could result in an appreciable increase in accidents which will warrant physical or safety-related improvements.

### **3.1.9.4      Assumptions, Assumed Mitigations, and Environmental Impacts of the Proposed Action and Project Alternatives**

Assumptions. Basic assumptions used in the roadway analysis include the following:

- o The transporter/erector routes will be upgraded to meet the vehicle standards of the project;
- o The existing conditions of other public roadways that are impacted by project-related construction vehicles will be adequately maintained during the construction phase; and
- o Necessary roadway changes concerning the F.E. Warren AFB roadway Alternatives R1, R2, and R3 will be made to meet the vehicle standards of the project.

Assumed Mitigations. There are no assumed mitigations.

Environmental Impacts. For the roads analysis, the methodology for characterizing road and traffic conditions for future baseline years and under the Proposed Action involved an assessment of travel demand, traffic engineering, and physical conditions of roads and bridges. Key components of this methodology are summarized below.

In the Cheyenne area, estimations of baseline future travel demand reflect population forecasts and the associated allocation of new housing units to parts of the Cheyenne area where anticipated growth could logically occur. Based on discussions with city and state officials, probable roadway improvements that could occur in the Cheyenne area were incorporated into the roadway network model for the project's peak construction year in

Cheyenne (1985) and for the operational period beginning in 1990. Trip generation procedures were then used to produce baseline future traffic conditions in the Cheyenne area for 1985 and for the operational period beginning in 1990.

For project-related impacts on travel demand in the Cheyenne area, project manpower estimates formed the basis for determining housing needs and subsequently determining travel demand. Project-related traffic patterns were evaluated on the basis of anticipated work locations, work schedules, and vehicle occupancies. For this study, a conservative analysis was developed. It was assumed that all project-related employees will make work trips during the same peak hour, and that vehicle occupancies will be low. Based on the above assumptions, the peak-hour project-related traffic demand was determined. The number of additional vehicle trips made as a result of the project was then combined with future baseline traffic volume estimations to determine impacts of the project on the road system.

Level of service, capacity, queuing, delay, and safety analyses were performed for traffic conditions for the roadway study network for the peak construction and operational period.

For physical conditions of roads under baseline future conditions, it was assumed that Minuteman transporter/erector routes will continue to be used and the roadway condition will remain essentially unchanged with the current level of maintenance.

To assess physical conditions of roads under the Proposed Action, it was assumed that the stage transporter vehicle will use existing transporter/erector routes to the maximum extent possible. The analytic methods used to assess the ability of these transporter/erector routes to accommodate the extreme weight and size of the stage transporter vehicle consisted of comparing the physical characteristics of the transporter/erector routes (as assembled during the road inventory) with the various design standards relating to the stage transporter vehicle. These standards specifically refer to roadway width, shoulder width, pavement structure, curve radii, superelevation, cross slope, longitudinal grades, vertical clearance, and cover for culverts.

Estimates were made of Deployment Area traffic on selected routes. During the construction phase, light vehicle traffic on these roads is expected to increase in the range of 10 to 100 vehicles per day. In a similar fashion, heavy truck traffic may increase in the range of 2 to 20 vehicles per day on selected routes. A conservative approach was again taken, and the upper ranges for both vehicle types were employed in analyzing impacts on the rural roads.

To assess baseline future conditions for railroads, aviation, public transit, and pedestrian and bicycle facilities, the methodology employed in profiling existing conditions was extended to future baseline years, based on future traffic trends and information on probable improvements or changes in operational activities during these years.

To assess project-related impacts on these elements, project-related demands were added to future baseline conditions and the ability of each transportation mode's system to serve these demands were evaluated.

#### 3.1.9.4.1 Roads

##### 3.1.9.4.1.1 Cheyenne

Baseline Future - No Action Alternative. The peak construction period at F.E. Warren AFB is anticipated to be 1985 with the operational period beginning in 1990. Therefore, these periods were employed in the analysis to provide a comparison of future baseline traffic conditions (without the project) with project-related traffic conditions as described in the next section.

Analysis of the baseline Cheyenne road system indicates that traffic problems may arise, not so much from overall high traffic volumes but from deficiencies in the circulation system. The development of an adequate circulation system would spread traffic demand over a larger system, thus avoiding the concentration of traffic demand that leads to congestion.

Specific corridors with baseline circulation problems include the following:

- o Missile Drive to Deming Drive;
- o Deming Drive - Ninth Street to Converse Avenue;
- o Converse Avenue between Dell Range Boulevard and Pershing Boulevard;
- o 16th Street/Lincolnway between Missile Drive and Converse Avenue;
- o 19th Street and 20th Street between Missile Drive and Pershing Boulevard;
- o Central Avenue - Yellowstone Road between Eighth Street and Prairie Avenue; and
- o Evans Avenue between Pershing Boulevard and 16th Street.

In addition to the above, several intersections on Pershing Boulevard, Randall Avenue, and Dell Range Boulevard have baseline circulation problems.

Proposed Action. Under the Proposed Action for 1985 (the peak onbase construction year), the assignment of AM peak-hour traffic volumes indicates that several roadway sections, intersections, and interchanges may have traffic volume increases. Many additional intersections will have a negligible impact. Project-related operational traffic beginning in 1990 will have a negligible and not significant impact.

Road traffic demand on the Cheyenne roadway system under the Proposed Action will have an overall moderate, short-term, local impact that will be significant because it will reduce level of service below minimum desirable design standards. In particular, level of service decreases will occur at the Interstate 25 at Randall interchange; at the intersections of Yellowstone Road with Prairie Avenue and Central Avenue; at various intersections on 19th Street and 20th Street between Pershing Boulevard and Missile Drive; at various intersections on Pershing Boulevard between Converse Avenue and Randall Avenue; at the intersections of 16th Street with Ames Avenue and Missile Drive; at the intersections of 24th Street with Central Avenue and Carey Avenue; and at the intersection of Snyder Avenue with Randall Avenue. Level of service reductions at some of these intersections have moderate or high impacts. Several impacts are significant since the level of service is reduced below minimum desirable design standards. There is an overall moderate, short-term, local impact that is significant.

A moderate, short-term, local level of impact that is significant will occur due to the length of queues at the Randall gate entrance to F.E. Warren AFB, and at other intersections in Cheyenne. The impact will be significant since the queues may extend to the adjacent intersections. There will be a moderate, short-term level of impact in safety at the Randall interchange due to the potential for accidents. This is significant because it will require geometric improvements to the interchange. However, at the overall local level, there will be a low, not significant impact on safety in terms of the number of accidents resulting in property damage and minor injuries. At various intersections there will be low impacts in the amount of delay motorists will experience.



The higher traffic in Cheyenne due to the city's population increase will have a low impact on the physical condition of city streets, which will be corrected during routine maintenance. This impact will not be significant.

Three alternative road configurations (referred to as R1, R2, and R3 in Figures 1.6.2-2 to 1.6.2-4) were specified for F.E. Warren AFB. Alternative R2 is the Proposed Action. These alternatives essentially offer varying means of access to the Stage Storage Area and the Weapons Storage Area. Both R1 and R2 involve the realignment of Happy Jack Road to the Missile Drive interchange with Interstate 25. This includes the potential removal of the existing Happy Jack Road bridge over Interstate 25. This realignment of Happy Jack Road has been proposed by state and local transportation officials independently of the Peacekeeper project. Alternative R1 also proposes that the Country Club Road bridge be raised or that the Interstate 25 grade be lowered at this crossing. Alternative R3 proposes that Round Top Road be utilized for access to either Interstate 80 or U.S. 30. A new interchange with Interstate 80 would be required.

Some motorists who live near the Happy Jack Road crossing with Interstate 25 may find it inconvenient to use Missile Drive rather than the present Happy Jack Road crossing. However, the majority of motorists who use Happy Jack Road will have the following advantages due to the realignment:

- o Faster access to Interstates 25 or 80 via the Missile Drive/Interstate 25 interchange.
- o Safer access to downtown Cheyenne than is available via the hazardous Colorado and Southern Railroad underpass "tubes" on Happy Jack Road east of Interstate 25.

Thus the Happy Jack Road realignment should result in a long-term benefit. No short-term construction delays should be encountered by Happy Jack Road motorists since the realignment will be completed before traffic is diverted from the present Interstate 25 crossing. Construction delays on Interstate 25 may be encountered when the Happy Jack Road bridge is removed for R1 and R2, but these delays should have a low and not significant impact.

Alternative R1 will have a high level of impact that will be significant due to delays associated with the construction phase of the Country Club Road bridge improvements. The current bridge is too low for Peacekeeper traffic and either the bridge must be raised or the roadway lowered. If the bridge is raised, the existing traffic will have to be diverted to the Interstate 25/Central Avenue interchange. If the Interstate 25 grade is lowered, the Interstate 25 motorists will be delayed during this construction operation.

Proposed Action R2 and Alternative R1 have a low and not significant impact due to construction delays encountered when the Happy Jack Road bridge is removed.

Alternative R3 will have a low impact that will not be significant due to minor construction delays associated with the physical improvements to Interstate 80 and Round Top Road. This alternative includes the construction of a new diamond interchange with Interstate 80, which should cause only minor construction delays.

A design option to R1 and R2 involves the retention of the present Happy Jack Road and Country Club Road bridges with the existing vertical clearances over Interstate 25. It may be possible for the stage transporter vehicle to operate with the existing clearances under certain driving conditions and with lane usage restrictions. If this design option is adopted, the impacts associated with the bridge changes would not be applicable.

A design option for R2 and R3 involves the utilization of Round Top Road as a means of connecting the Stage Storage Area and the Weapons Storage Area. It is assumed that a new bridge structure will be required for the Crow Creek crossing. It is further assumed that a temporary structure will be provided during the building of the new bridge. This will minimize delays for Round Top motorists and result in a low and not significant impact for this design option. Also, the roadway improvements on F.E. Warren AFB associated with R1, R2, and R3 will cause minimum delays and will result in low and not significant impacts.

Implementation of R1, R2, or R3 would provide for the separation of project-related traffic from other base traffic, resulting in long-term benefits and improved circulation on the base. Both R2 and R3 provide a direct connection between the Weapons and the Stage Storage Areas. This connection will facilitate the onbase movement of Peacekeeper vehicles between these areas and reduce the impact on offbase roadways which would occur with R1.

Regardless of which alternative is selected, it appears that general traffic will continue to utilize Gates No. 1 and 2 due to the proximity to Cheyenne population centers. The alternative Round Top Road entrances will be primarily used by the stage transporter vehicle and associated operations.

#### 3.1.9.4.1.2 Rural Areas and Small Communities

Baseline Future - No Action Alternative. The peak years of construction in rural areas will depend upon phasing of Launch Facility-related construction. It was assumed that 1986 through 1989 would be the peak construction years for rural areas. It was further assumed that the operational phase would begin in 1990. These years are evaluated for the project baseline future analysis of traffic conditions under the No Action Alternative to form a comparison with project-related traffic conditions for these years under the Proposed Action.

There will be low road traffic demand under baseline future conditions. Though traffic volumes will increase during these years, there will be no change in level of service category and motorists will perceive no significant change in traffic operations.

Average daily traffic figures during harvesting of crops in the Region of Influence show a marked increase over annual average daily traffic figures. Data from a permanent traffic counter located in the area provided an insight to the problem. In Goshen County (the location of the permanent counter) peak-day traffic volumes were approximately 2.5 times the average volume for the year, which indicated an area of special concern during project construction activities. The average daily traffic volume at this particular counter was about 400 vehicles, and the highest daily volume during the harvest season was about 1,000 vehicles. Similar relationships between peak harvest traffic and average daily traffic can be expected in the other counties within the Region of Influence.

Assuming Minuteman transporter/erector routes will continue to be used during 1986 through 1990, their physical condition will remain essentially unchanged and adequate for Minuteman operational activities.

Proposed Action. The Proposed Action requires that existing transporter/erector routes be able to accommodate the specifications of the stage transporter vehicle. Projected roadway deficiencies on transporter/erector routes were assessed through an evaluation of existing roadway conditions provided by the road inventory and applicable project design standards. Table 3.1.9-2 shows basic roadway and structural deficiencies identified during this evaluation. It should be noted that the potential road and structural deficiencies identified in

Table 3.1.9-2

COMPARISON OF EXISTING CONDITIONS  
WITH VARIOUS DESIGN STANDARDS  
FOR ALL COUNTIES

<hr/>		
<b><u>Total Miles of Road:</u></b>	969.90	
 <b><u>Gravel Roadways</u></b>		
Total Miles	306.83	
 <b><u>Geometric Conditions</u></b>		
Number of Substandard Curves <sup>1</sup>	62	
 <b><u>Culverts</u></b>		
<b>Type</b>	<b>Total Number</b>	<b>Number with Deficient Cover<sup>2</sup></b>
<hr/>		
Box Culverts	157	No Standards
Reinforced Concrete Pipe	526	68
Corrugated Metal Pipe	1,077	352
Metal Pipe Arch	111	44
Other	0	No Standards
Reinforced Concrete Arch Culverts	23	10
<hr/>		

<sup>1</sup> Substandard curves are horizontal and vertical curves that would be unable to accommodate the required turning radius and configuration of the stage transporter vehicle.

<sup>2</sup> Cover refers to the thickness of material over the top of a culvert structure that acts to distribute the applied traffic loading.

this report are being verified through an evaluation process by the Military Traffic Management Command, the Federal Highway Administration, the Department of the Air Force, and the state and local transportation departments.

Transporter/erector roadways must have adequate surface type and width. Preliminary results of the Military Traffic Management Command roadway evaluation study indicate that substantial road and bridge improvements will be necessary. Many miles of existing gravel roads will probably be paved, and existing paved roads may be reconstructed or resurfaced. The roadway evaluation study developed preliminary surfacing options, shown in Table 3.1.9-3, to accommodate the Peacekeeper project.

The Interstate highways will remain unchanged except for improvements to structures, mainly culverts. In addition, the Nebraska Department of Roads has recommended that seven links be removed from the transporter/erector system and nine links added. The study also identified needed improvements to culverts and bridges.

Aggregate quantities determined from the Wyoming and Nebraska highway proposals are expected to be maximum estimates. Option A would require 1,700,000 cubic yards (cy) of aggregate and 710,000 cy of asphaltic concrete. Option B would require 1,380,000 cy of aggregate and 1,050,000 cy of asphaltic concrete. As recommended by the Federal Highway Administration, careful consideration should be given to using existing gravel in place.

Additional truck traffic will be required to transport these construction materials. During the peak construction period approximately 350 daily truck trips will be required over the six county area. This traffic will be in addition to baseline truck traffic, which surveys show to be generally light except for the harvest period.

Construction activities to upgrade the transporter/erector routes (including certain bridges) will have short-term, adverse impacts on the level of service, delays, and safety of many of the roads in the six counties involved. Level of service and safety impacts will be low and not significant. Delay impacts will be moderate and significant especially when coupled with agricultural traffic at harvest time. Construction activities at the Launch Facilities are expected to cause delays that will have low impacts that are not significant. Likewise, maintenance activities associated with other project-related roads will have short-term adverse impacts on motorist delays. These delay impacts will be low and not significant.

Table 3.1.9-3

## SURFACING OPTIONS FOR TRANSPORTER/ERECTOR ROUTES

OPTION A		OPTION B	
Combination Aggregate (agg.) and Asphalt (asph.)		All Asphalt	
<u>Miles</u>	<u>Roadway Section</u>	<u>Miles</u>	<u>Roadway Section</u>
WYOMING			
75.29	40' wide; 6" agg. plus 3" asph.	181.39 <sup>a</sup>	Same as Option A
106.57	32' wide; 6" agg. plus 3" asph.		Same as Option A
17.90	32' wide; 3" asph.		Same as Option A
105.12	28' wide; 3" asph.		Same as Option A
145.11a	28' wide; 9" agg.		20' wide, 3" asph.
36.28a	24' wide; 9" agg.		on 28' wide, 9" agg. base
NEBRASKA			
84.6a	22' wide; 7" asph.	71.2 <sup>a</sup>	Same as Option A
71.2a	27' wide; 4" agg.		20' wide; 7" asph.
31.5	1" asph. overlay on two 8' shoulders		Same as Option A

<sup>a</sup> Indicates currently a gravel-surfaced roadway

Overall, however, there will be a substantial long-term beneficial effect on the physical condition and safety of the transporter/erector routes due to upgrading activities associated with the project.

The town of Wheatland in Platte County will be impacted by the project as follows: the Ninth Street and South Street intersection, the 16th Street and South Street intersection, and the Ninth Street and Gilchrist Street intersection will have level of service reductions. All these impacts, which range from low to high, will be significant.

The traffic analysis identified one intersection with a level of service reduction in Torrington. The Main Street intersection with U.S. 26 and 85 will have a level of service reduction resulting in a moderate impact which will be significant.

Project-related traffic increases will have negligible impacts in Pine Bluffs.

Cable routing alternatives will have negligible impacts on transportation that will be not significant.

The forecast increases in transportation activities due to the dispatch station options are low. For the Proposed Action, which includes Kimball and Chugwater, this will result in a low impact on roads that will not be significant.

The Kimball railroad bridge over Nebraska State Highway 71 presently has a clearance of only 13 feet, 6 inches. Design options exist to preclude the necessity of substantial and impractical changes to the existing railroad overpass. These include:

- o Use the existing county road in Banner County between Launch Facility B-5 and State Highway 71, adding about 12 miles of roads to the Defense Access Road system.
- o Use the existing county road in Banner County between Launch Facilities B-6, D-2, and State Highway 71, adding about 16 miles of roads to the Defense Access Road system.
- o Use the existing county road 2 miles west of State Highway 71 on U.S. 30 across an existing railroad at-grade and proceeding 1 mile north, then 2 miles east to State Highway 71 which will require improvement of the at-grade railroad crossing. This adds about 3 miles of roads to the Defense Access Road system. This is the Proposed Action.

In addition to the mileage added by each design option to the Defense Access Road system, the first two design options involve a more circuitous travel route, thus generating more vehicle-miles of travel for stage transporter operations. The Proposed Action will require the least amount of upgrade and the least impact on the whole Defense Access Road system.

#### 3.1.9.4.2 Railroads

##### 3.1.9.4.2.1 Baseline Future - No Action Alternative

Based on recent trends and discussion with rail officials, it can be assumed that rail activity on the system as it presently exists will remain reasonably stable.

##### 3.1.9.4.2.2 Proposed Action

The existing rail system is operating at well under capacity and could handle added shipments related to the project. At the Cheyenne rail yard, any foreseeable effect on its operating capacity can be readily handled. This will constitute a negligible level of impact at the site and regional level and be not significant. Likewise, delays at railroad crossings in Cheyenne will have a low and not significant impact.

#### 3.1.9.4.3 Aviation

##### 3.1.9.4.3.1 Baseline Future - No Action Alternative

Cheyenne Airport. Cheyenne Airport has seen large variations in air traffic over the years due to a number of factors such as military constructions, airline headquarters basing, the air controllers' strike, fuel shortages, high interest rates, and airline fare structures.

Air passenger traffic activity at Cheyenne has made a marked recovery during 1983, due to the changes in the fare structure and to the general economic recovery. Long-term trends will depend upon continued competitive fares, lower fuel prices, low interest rates, and improved national and regional economics.

Real personal income, which is the most significant factor in determining air passenger travel, is expected to increase in Cheyenne and its neighboring areas.

Anticipated schedules for Frontier Commuter and Rocky Mountain Airways formed the basis for 1984 turbo operations, and an annual growth rate of 5 percent is assumed thereafter. The difference in growth rates between passenger traffic (6.67%) and operations (5%) accounts for a gradually increasing load factor.

Analysis was performed for the Cheyenne Airport regarding runway capacity, terminal capacity, and parking capacity at the terminal. According to the 1979 Cheyenne Municipal Airport Master Plan, the hourly capacity of the existing runways is between 99 and 152 operations per hour. Airport traffic control personnel estimate from experience that 75 to 90 operations per hour is a more realistic figure.

Based on Federal Aviation Administration (FAA) criterion, 24,200 square feet (sq ft) of terminal space should be provided per 100 typical peak-hour passengers. For Cheyenne, the typical peak-hour passenger is estimated to be 0.12 percent of the annual flows, or 62 typical peak-hour passengers in 1990 (Airport Engineering, Ashford and Wright 1979). Thus, approximately 15,000 sq ft of terminal space will be required. Although this is still about 1,000 sq ft less than what is presently available, the present arrangement allows only 570 sq ft for the security area and no space for a secured waiting area. Airport management suggests that approximately 5,000 sq ft will be needed to add facilities necessary to efficiently serve commercial passengers.

At present, an insufficient number of spaces are available to the public for long and short-term parking. The problems of the airport can be summarized as having inefficient traffic flow due to a lack of defined passenger pickup and drop-off zones, a series of islands which serve to confuse rather than direct traffic flow, and a deficiency in parking. These problems will become critical in the near future, as the airport continues its normal growth. Failure to resolve these problems could inhibit the airport's growth.

Area Airports. With the exception of Scotts Bluff County Airport, area airports are almost totally oriented to general aviation. These general aviation airports serve only a limited number of aircraft and are largely underused and will remain so during baseline years.

Capacity at Scotts Bluff Airport is well above the 1991 annual operations of 63,600 operations projected by a 6-percent area growth factor, and the 81,300 operations projected for 1990 by the Master Plan. The Master Plan states that passenger terminal area required will be 11,000 sq ft as compared to the existing 3,656 sq ft.

The Kimball Airport's 3,750-foot runway has recently been resurfaced and the Airport Authority has commissioned a master plan study with the objective of extending the runway length to 6,000 feet, increasing hangar space, and providing a jet fuel storage facility. These measures, if implemented, would attract more aircraft to Kimball Airport; it is understood that at present many aircraft do not use the airport due to the short runway length.

Denver's Stapleton International Airport continues to grow rapidly and future expansion is planned.

#### 3.1.9.4.3.2 Proposed Action

Cheyenne Airport. Two factors could result in project-related impacts to the Cheyenne Airport. One is the increased corporate and private traffic related to the project such as project-related manufacturers and contractors, government agencies, and high technology companies.

Another main factor affecting the airport will be the use of possible helicopters and small aircraft by the contractor. Because of the driving distances to the various sites, helicopters and small aircraft could possibly be used to shuttle personnel, supplies, and small equipment to the sites. It is estimated that the project may add as much as 8,300 annual operations during construction. About 1,500 of these will involve jet traffic. Additional project-related traffic will be below theoretical runway capacity but may slightly increase the deterioration of runway pavements.

Should contractors utilize helicopters for construction activities, additional apron space will be required. Two solutions to this problem are possible:

- 1) Park helicopters on grass areas which will be allocated by airport officials; and
- 2) Should contractors require a paved apron, the Airport Authority would lease a grass area to contractors, which can be paved (by contractor).

Peak project-related enplanements will occur in 1986 and may require slight increases in land-side facilities over baseline needs. This will have a low and not significant impact.

The Proposed Action will not result in any changes to FAA regulations concerning overflying in the area.

Area Airports. Because of their locations on the periphery of the project area, the general aviation airports, with the exception of Kimball, will be negligibly impacted.

Kimball is a possible site as a dispatch station under the project, and the possibility of again having a small fleet of aircraft based there is reasonable. The Kimball Airport is in a rural area located some distance from residential property. The airport has the capacity to handle a large number of helicopters, both for air operations and ground parking areas. Thus the impact at Kimball will be low and not significant.

#### 3.1.9.4.4 Public Transit

##### 3.1.9.4.4.1 Baseline Future - No Action Alternative

Jitney, Inc., a privately owned company, has been in operation in Cheyenne for only a short time, and offers a minimum level of service to the community. Few people use the service, which only carries about 300 to 400 passengers per week. Jitney, Inc. is considering expanding its routes to more areas of the city in the future. Taxi service is also currently operating at a low level in Cheyenne.

Transit demand in an auto-oriented community like Cheyenne is not readily measured. If demand does not exist in the area under consideration, it can only be determined by implementing service. Ridership levels then determine the extent of service that can be justified. Based on the current low level of service provided, it would appear that only slight increases in ridership will occur in the foreseeable future.



Both Greyhound and Trailways project approximately 5 to 10-percent growth across their systems. No changes to the present area of service are foreseen.

#### 3.1.9.4.4.2 Proposed Action

Project-related demand will result from increases in population and housing due to the project. It is doubtful if the current or anticipated service is adequate to attract project employee work trips. Routings are very limited, and the long headways offer a poor transportation alternative.

It appears that project-related employees will have occasion to use taxi service for convenience reasons, and may increase taxi demands. If additional demand occurs, the taxi operator could readily add vehicles and drivers. In general, the impacts on the transit and taxi system in Cheyenne will appear to be negligible and not significant.

High income levels of project-related employees also will indicate a low demand for intercity bus service. The increased level of economic activity will probably result in limited demand increases.

#### 3.1.9.4.5 Pedestrian and Bicycle Facilities

##### 3.1.9.4.5.1 Baseline Future - No Action Alternative

Improvements to the major network will probably occur in association with major development projects. Through various land use policies, the City is encouraging developers to develop bikeways, pedestrian paths, and greenbelts as part of their individual undertakings. Currently, City and State expenditure on these facilities is approximately \$50,000 per year.

The City of Cheyenne adopted a formal Bikeway Plan in December 1975. This established a general development framework for a master bikeway network, subsequent to which a Bikeway System Plan was developed. To date, approximately 40 percent of the system has been implemented. Major emphasis of the system has been north Cheyenne in the areas of Dell Range and Pershing boulevards, 19th Street, and Logan Street, where large recreational facilities are present. Improvements under this program are envisaged in the South Cheyenne area for the Interstate 180 Corridor, Optimist Park, and Village Creek South.

The pedestrian network is extensive in central Cheyenne, but areas in north and South Cheyenne are almost void of formal pedestrian paths. These facilities are at present inadequate.

##### 3.1.9.4.5.2 Proposed Action

The relative population increases and distribution related to the project will cause a low impact that is not significant on the Cheyenne pedestrian and bikeway network. The very nature and layout of the existing network will meet much of the demand of the increased population. However, certain areas will be impacted more heavily than others, such as around schools and colleges catering to the increased population during the construction phase of the project.

### 3.1.9.5 Summary of Impacts

#### 3.1.9.5.1 Explanation of Detailed Impact Matrix

The effects of the Proposed Action on the transportation resource which have been described previously are summarized in Figure 3.1.9-1.

Overall, the transportation facilities will be substantially improved due to the upgrading of the existing transporter/erector road network. Short-term, adverse impacts will occur due to the construction activities associated with F.E. Warren AFB and the Launch Facilities. For example, traffic congestion may occur at various locations in Cheyenne, most noticeably at the Interstate 25 at Randall Avenue interchange. Also, construction activities associated with the Launch Facilities and the transporter/erector road system may have an adverse impact on rural roadways. The long-term, beneficial effects of the Proposed Action appear to far outweigh the short-term, adverse impacts.

It should be noted regarding Alternatives R1, R2, and R3, that none of the alternatives change the overall effect of the road impact evaluation at the local level.

Cable alternatives will have negligible impacts that are not significant.

The Proposed Action and project-element alternatives for the dispatch stations, which includes Kimball and Chugwater, have a low impact that is not significant.

The capacity of land-side facilities at Cheyenne Airport would have a low impact that is not significant since possible increased operations, over an extended period of time, would not warrant any appreciable physical improvements. Impacts on area airports are low and not significant, primarily due to the Kimball impact.


Negligible impacts would occur on public transit systems and low impacts on pedestrian and bicycle facilities in Cheyenne. The impacts are not significant.

#### 3.1.9.5.2 Aggregation of Elements, Impacts, and Significance

Figure 3.1.9-1 presented the aggregation of impacts for transportation as a whole. The aggregation for transportation results in low and significant impacts at the site level in the short term, moderate and significant impacts at the local level for the short term, and low and significant impacts at the regional level for the short term. Long-term effects to roads are considered beneficial.

The overall rating for transportation was based on a qualitative professional evaluation of subelements and then elements as given in Figure 3.1.9-1. The level of impact for the subelements of roads at the site level was basically low except for delay which was rated moderate and significant. Thus, the aggregated level of impacts at the site level for roads is low and significant. At the local level the moderate and significant level of impact for roads reflects the fact that several subelement impacts are moderate and significant. The low and significant level of impact to the regional level reflects the moderate and significant level of impact for delay. The overall rating for transportation, again based on qualitative professional evaluation, reflects the dominance of roads among the five elements.

The short-term site impacts are due to construction activities on and near the roads in the Deployment Area. The short-term local impacts are due to the added volume of traffic which will cause a decrease in level of service at a number of intersections and an increase in queuing at the Randall Avenue gate to F.E. Warren AFB. The short-term regional impacts are

LEGEND		ADVERSE IMPACTS	SIGNIFICANT ADVERSE IMPACTS
LEVEL OF IMPACT ★	LOW	○	●
	MODERATE	○	●
	HIGH	○	●
POTENTIAL BENEFICIAL EFFECTS			
★ MEASURE OF THE AMOUNT OF ENVIRONMENTAL CHANGE			

PROJECT IMPACTS						
SHORT TERM			LONG TERM			
	SITE		LOCAL		REGIONAL	
	●		●		●	
	●		●		●	
	○		●		○	
			○			
			●			
	●		○		●	
	○		○		○	
			○			
			○			
			○			
			○			
			○			

FIGURE 3.1.9-1 TRANSPORTATION SUMMARY IMPACT MATRIX

due to the roadway construction activity on the regional transportation system as a whole. The overall long-term impacts to transportation are beneficial due to the improvement of the physical condition of Deployment Area roads and the associated increase in safety.

The cable alternatives to the Proposed Action have a negligible and not significant impact. The project-element alternative for the dispatch stations has a low and not significant impact. Alternative R3 of the F.E. Warren AFB circulation routes has a low and not significant impact due to the amount of construction activities and their effect on Round Top Road and Interstate 80. Proposed Action R2 has a low and not significant impact due to construction delays encountered when the Happy Jack Road bridge is removed. Alternative R1 has a high level of impact on delays that will be significant due to the Country Club Road bridge improvements. The impacts of cable, roads, and dispatch alternatives are summarized in Figure 3.0-2.

#### 3.1.9.6 Mitigation Measures

Potential mitigation measures that will be considered are identified below with the objective of increasing the level of service and reducing delays and queuing. One, some, or all of the mitigation measures may ultimately be selected. Each measure identifies the party responsible to implement, but not necessarily to fund, the measure.

Mitigation measures for roads are listed for consideration:

- o Schedule work hours for project-related employees to avoid normal current traffic peak hours. This mitigation will be effective in controlling peak-hour traffic flow increases, and if selected, should be implemented throughout the construction and Assembly and Checkout phase of the project. The responsible parties for implementing this mitigation measure are the Air Force and their contractors.
- o Coordinate with local jurisdictions to minimize construction-related problems. This may involve the formation of coordinating committees that serve as a forum to address transportation issues. This mitigation will be effective in reducing potential conflicts, and if selected, should be implemented throughout the construction phase of the project. The responsible parties for implementing this mitigation are the Air Force Site Activation Task Force, construction management, contractors, and state and local officials.
- o Provide project-related employees incentives for using high occupancy vehicles such as van pools or car pools. This mitigation will be effective in reducing the project-related traffic increase, and if selected, should be implemented throughout the construction phase of the project. The responsible agencies for implementing this mitigation measure are the Air Force and its contractors.
- o Modify the geometric design of the Interstate 25 interchange at Randall Avenue. This mitigation will be effective in increasing the capacity and safety of this interchange, and if selected, should be implemented by the end of 1984. The responsible agency for implementing this mitigation measure is the Wyoming Highway Department.
- o Improve traffic signalization and make related geometric improvements at the intersections of Yellowstone Road with Prairie Avenue and Central Avenue; at various intersections on 19th Street and 20th Street between Pershing Boulevard and Missile Drive; at various intersections on Pershing Boulevard between Converse Avenue and Randall Avenue; at the intersections of 16th Street with Ames Avenue and Missile Drive; at the intersections of 24th Street with Central Avenue

and Carey Avenue; and at the intersection of Snyder Avenue with Randall Avenue. These mitigation measures will be effective in raising the level of service, and if selected, should be implemented by the end of 1984. The responsible agencies for implementing these mitigation measures are the City of Cheyenne and the Wyoming Highway Department.

- o Improve traffic signalization and make related geometric improvements in Wheatland at the Ninth Street at South Street intersection, the 16th Street at South Street intersection, and the Ninth Street at Gilchrist Street intersection. These mitigation measures will be effective in raising the level of service at these intersections, and if selected, should be implemented by the end of 1985. The responsible agencies for implementing these mitigation measures are the Town of Wheatland and the Wyoming Highway Department.
- o Improve traffic signalization and make related geometric improvements in Torrington at the intersection of Main Street and U.S. 26 and U.S. 85. This mitigation measure will be effective in raising the level of service, and if selected, should be implemented by the end of 1986. The responsible agencies for implementing this mitigation are the Town of Torrington and the Wyoming Highway Department.
- o Use of irretrievable resources, particularly aggregates for road construction, can be minimized through use of appropriate design methods. The Federal Highway Administration has suggested that consideration be given to stabilizing existing gravel in place as a means to reduce aggregate usage on transporter/erector road improvements. If selected, this should be implemented in the preliminary design phase. The responsible agencies for this mitigation are the Wyoming Highway Department and the Nebraska Department of Roads.

No mitigation measures are required for railroads, public transit, pedestrian or bicycle facilities, or aviation.

#### 3.1.9.7 Unavoidable Adverse Impacts

It does not appear that there would be any residual adverse impacts resulting from the project. Short-term adverse impacts due to road construction are unavoidable.

#### 3.1.9.8 Irreversible and Irretrievable Resource Commitments

There are no irreversible and irretrievable resource commitments for transportation.

#### 3.1.9.9 The Relationship Between Local Short-Term Use of Man's Environment and Maintenance and Enhancement of Long-Term Productivity

In the short term, transportation-related activities will have some adverse impacts in the city of Cheyenne, the towns of Wheatland and Torrington, and on project-related rural roads. These activities will involve the improvement of existing facilities and previously disturbed environment and will only marginally affect previously undisturbed areas.

The net outcome of all project-related transportation construction will be improved traffic flow in the Region of Influence with associated benefits in terms of driver and pedestrian safety, reduced maintenance costs, and vehicle operating costs. In terms of natural environment, minimal disturbance is expected after completion of project activities.

### **3.1.10      Land Use**

#### **3.1.10.1    Introduction**

This section describes the impacts of the Proposed Action on urban and rural land use. A description of the criteria used to classify impacts and determine their significance is contained in the following sections.

The communities of Cheyenne, Wheatland, Kimball, Pine Bluffs, and Chugwater comprise the urban land use Area of Concentrated Study. These five communities include those areas where population and housing growth could result in impacts to land use. Project development will have both direct and indirect potential impacts with respect to rural land use and agriculture. Direct impacts refer to cause-and-effect disturbances as a result of project activities (such as crop destruction), whereas indirect impacts are associated with project activities, e.g., potential interference with access to crops or marketing of them. The Area of Concentrated Study for rural land use and agriculture is the Deployment Area, including the Launch Facilities, the Quantity Distance zones surrounding each Launch Facility, those areas between Flights where new cable system routes are proposed, and the transporter/ erector roads.

The information in this section is based upon data and detailed analysis contained in the Land Use Environmental Planning Technical Report.

#### **3.1.10.2    Definitions of Levels of Impact**

##### **3.1.10.2.1    Urban Land Use and Planning**

The levels of impact for urban land use and planning consider two factors: absorption of developable vacant land during the growth cycle and the potential for underutilization of developed land during the decline cycle. While infill is generally desirable, total depletion of vacant developable land could result in a need for annexation or encourage scattered development in unincorporated areas where costs for utilities and services would be high. An underutilization of developed land could result in reduced maintenance of properties and inefficient use of utilities and services, thereby creating a financial burden on local government and/or local taxpayers. The urban land use analysis assumes that future development will be located where it will be compatible with existing uses and conform to adopted plans and policies.

Levels of impact for urban land use are:

- o      Negligible Impact - Will result in no change in land use beyond baseline projections or will cause only minor reductions in the supply of vacant developable land.
- o      Low Impact - Will cause changes in land use that would substantially reduce the supply of vacant developable land during the growth cycle or create an underutilization of developed residential land during the decline cycle that is less than the highest recent average annual residential vacancy rate (recent = 1970 to 1982).
- o      Moderate Impact - Will cause changes in land use that either deplete the supply of vacant developable land or create an underutilization of developed residential land that exceeds the highest recent average annual residential vacancy rate.

- o High Impact - Will cause changes in land use that deplete the supply of vacant developable land and create an underutilization of developed residential land that exceeds the highest recent average annual residential vacancy rate.

#### 3.1.10.2.2 Rural Land Use and Agriculture

The levels of impact for rural land use consider the amount, type, and duration of direct land use impacts projected for the proposed project in relation to the character of the area in which the impact occurs. The definition takes into account potential interruptions or changes in existing uses (as in the case of temporary interruption of agricultural land use from construction of the proposed cable routes) and restrictions on current and future land uses (as in the case of restrictions on residential uses within the Quantity Distance zones).

Indirect project impacts for agriculture refer to agricultural productivity, not necessarily in a monetary sense but defined as management practices or actions which serve to facilitate an economic return from the land, applicable to both farming and grazing operations. For this analysis, three components comprehensively address potential impacts to agriculture. They are: 1) access to local roads and property, particularly during critical times such as planting and harvesting periods; 2) animal husbandry, the protection of livestock from hazards and the assurance of reproductive success; and 3) agricultural measures undertaken to maintain and improve crop and livestock values such as erosion control, strip cropping, and pasture rotation.

Levels of impact associated with rural land use and agriculture are:

- o Negligible Impact - Little change in the land use and character of the area or in agricultural productivity.
- o Low Impact - An interruption or restriction of land use that will not change the character of the area but will result in some interference with agricultural productivity.
- o Moderate Impact - An interruption or restriction of land use that will change the character of the area on a temporary basis and will decrease agricultural productivity.
- o High Impact - A permanent change in the land use and character of the area, precluding agricultural productivity.

#### 3.1.10.3 Determination of Significance Criteria

##### 3.1.10.3.1 Urban and Rural Land Use

Significance is a function of the level of impact and its interaction with the context in which the impact occurs. For both urban and rural land use, any one or a combination of the following could determine significance:

- o Whether the impact affects public health or safety;
- o Whether the impact is likely to be highly controversial;
- o Whether the impact compels land development in ways not expressly intended and is therefore inconsistent with adopted plans and policies;

- o Whether the impact threatens the violation of some federal, state, or local law or requirements imposed for the protection of the environment, or public health and safety; and
- o Whether institutional responses to the impact will need to be extensive, or are beyond institutional capacity to respond.

#### 3.1.10.4 Assumptions, Assumed Mitigations, and Environmental Impacts of the Proposed Action and Project Alternatives

**Assumptions.** The urban land use methodology applied land use standards to baseline population and housing projections to determine the amount and type of demand for land development. Local conditions and practices were considered to determine housing densities. Per capita standards were used for all nonresidential land uses. Vacant land absorption (in acres) was estimated. The methodology for the Proposed Action is similar to the No Action Alternative with the following addition: during the project's decline cycle the difference between project-induced land use and baseline demand was estimated to identify the potential for underutilization of developed land.

For rural land use, cable routes and Quantity Distance zones were analyzed through aerial photography and satellite imagery previously described. The amounts and types of land uses potentially affected by extension of the cable routes were determined through a "worst-case" analysis that identified the largest amounts of irrigated, then dry farmed, and finally rangeland uses (in order of economic value) that could be affected by proposed centerline paths. Total amounts for the five Proposed Action routes, the remaining six alternatives, and the five worst-case routes were then tabulated for comparison purposes. Typical agricultural practices in the region, including their frequency and timing, were evaluated to determine potential interference from the Proposed Action. The Quantity Distance zones were examined in terms of how restrictions might affect existing and future residential land uses.

For the urban land use analysis it was assumed that temporary population growth would create demand for additional development that might include some speculative building. Vacant land absorption in Cheyenne was analyzed with the assumption that the 1971 to 1982 average annual annexation of 100 to 200 acres per year would continue throughout the project period, although efforts to encourage infill would occur. (The city has proposed infill incentives such as density bonuses and foregoing front-end development costs.) For the other communities, annexation is possible but has not been assumed on an annual basis, consistent with local trends.

Analysis under rural land use assumed that most project-related road modifications would accommodate upgrading activities within existing rights-of-way with little direct impact on existing agricultural land uses. Activities at Launch Facilities were assumed to occur mostly within publicly owned land and have little effect on agricultural land use. Finally it was assumed that public roads would be exempted from the 1,050-foot Quantity Distance requirement.

With respect to agriculture, it was assumed that project construction activities could occur at any time; safety measures to protect livestock would be provided, including maintenance of fence enclosures to prevent straying and minimizing the length of time excavated trenches remain open; crop damage or delay in farming practices would be minimized and disturbed areas would have erosion control measures implemented; and that the Air Force and their sub-contractors would use techniques consistent with good engineering practice and appropriate to the site and region.



**Assumed Mitigations.** The only assumed mitigation for urban land use is cooperative community planning by project representatives, government agencies, and community groups. Assumed mitigations for rural land use and agriculture include restoration of topsoil, protection of irrigation systems, compensation for lost crops and livestock, and public notification and coordination related to road upgrading and associated activities.

**Environmental Impacts.** Environmental impacts of the Proposed Action and project alternatives are discussed in the following subsections.

#### **3.1.10.4.1 Baseline Future - No Action Alternative**

##### **3.1.10.4.1.1 Urban Land Use and Planning**

Population and housing projections that form the basis for baseline and project land use impacts in communities are presented in Section 3.1.1 of the FEIS (population) and in Section 3.5.2 of the Socioeconomics Environmental Planning Technical Report (housing).

**Cheyenne, Wyoming.** Under baseline conditions, Cheyenne's population is projected to grow by approximately 12,330 persons between 1983 and 1992. This would result in demand for approximately 1,014 acres of residential land use (818 acres of single-family, 93 acres of multifamily, and 103 acres of mobile home uses) and 694 acres of nonresidential land use (22 acres of commercial, 148 acres of industrial, 74 acres of parks, 123 acres of public and semi-public, and 327 acres of streets). This assumes that current local housing preferences will continue and that since existing developed urban land is generally consistent with per capita standards, additional population will create demand that cannot be absorbed by existing uses. Adequate amounts of vacant land should be available to absorb this new demand.

**Other Communities.** Baseline population and housing supply growth from 1983 through 1992 would create additional demand for 89 acres of developed land in Wheatland, 14 acres in Kimball, 25 acres in Pine Bluffs, and 12 acres in Chugwater. These amounts are within local capacities and would not result in adverse land use impacts. In the communities of Wheatland and Chugwater, where population has recently declined, future land development may be less than projections based on abstract standards, due to some existing capacity.

##### **3.1.10.4.1.2 Rural Land Use and Agriculture**

The percentage mix of agricultural land uses within the Deployment Area is expected to remain relatively stable under baseline conditions. The national trend toward larger farms, fewer owners, and less farm acreage is expected to be represented in the region. The dominance of wheat farming and cattle raising will doubtless continue.

#### **3.1.10.4.2 Proposed Action**

##### **3.1.10.4.2.1 Urban Land Use and Planning**

**Cheyenne, Wyoming.** Based on population influx and net housing demand from the project, there is a projected demand for 167 acres of vacant urban land in Cheyenne in addition to baseline. Increased housing demand may have a potential beneficial effect by creating infill of vacant lots. In 1987, the peak year, net demand will be 109 acres of nonresidential uses, 33 acres of single-family residential, 1 acre of multifamily residential, and 24 acres of mobile home residential. Availability of vacant land in Cheyenne should not be a constraint on new development.

If peak demand is met through new development, an underutilization of 1 acre of land developed for mobile homes could be created for 1 year during the decline phase. Underutilization potential results in a low, not significant impact in the short term since it would not exceed the highest recent annual average vacancy rate for mobile homes in the Cheyenne Urban Area when calculated in equivalent acreage. Impacts in the long term are negligible and not significant.

Other Communities. During the growth cycle, project-related demand for vacant land is projected to be 16 acres in Wheatland, 10 acres in Kimball, 9 acres in Pine Bluffs, and 3 acres in Chugwater, based on housing densities and per capita standards for nonresidential land use. Vacant land is available in each of these communities to absorb this growth.

During the decline cycle, underutilization of land developed for residential uses due to the project could occur in some communities. In Wheatland, between 1 and 2 acres of land developed for multifamily housing could become underutilized in 1987, but would be absorbed by 1990. Because this rate of underutilization is less than the highest recent annual average vacancy rate for the town, there would be a low, not significant impact in the short term. The long-term impact would be negligible and not significant.

In the city of Kimball, underutilization of approximately 1 acre of land used for mobile homes could occur starting in 1990 and continue past 1992 due to a projected absorption of between 0 and 0.12 acres under baseline growth. There would, therefore, be a low, not significant impact on Kimball generated in the short term, having a long duration. Pine Bluffs would experience underutilization of between 1 and 2 acres each for multifamily and mobile home uses, starting in 1989 and continuing past 1992. Baseline absorption of each of these uses is 0 to 0.12 acres annually, or approximately 1 unit every 2 years. Because this rate of underutilization exceeds the highest recent annual average vacancy rate for each of these uses, a moderate impact would be generated in the short term, having a long duration. The impact is not significant.

Impacts in Chugwater are negligible in the short and long term since the land that would be required for project-related development is not enough to deplete the supply of vacant land or create underutilization during the decline cycle.

#### 3.1.10.4.2.2 Rural Land Use and Agriculture

Indirect impacts to agriculture are those project-related activities that may result in some disruption of agriculture without directly affecting the resource, as would cable trenching. Indirect impacts were determined to include impedance of access to agricultural properties, effects on animal husbandry from various sources, and disruption or interruption of agricultural management practices.

Impedance of access to fields may interfere with both farming and ranching activities. Ongoing field and herd management practices such as tilling, cultivation, irrigation, and pasture rotation of cattle could be affected. Seasonal activities (seeding, harvesting, and transport of livestock to market) could be even more severely affected. The impacts would result from increases in traffic on rural roads (Section 3.1.9.4.1.2) and would be expected to occur during road modification and, to a lesser extent, during cable trenching. The level of impact is low in the short term but significant since the potential to affect economic return is present (especially during the critical periods of harvest and planting), and established means for compensation are not clear, possibly resulting in disputed claims. Potential impacts are, therefore, likely to be highly controversial.

Impacts involving animal husbandry refer to the possibility of livestock falling into open cable trenches; straying; and stress effects associated with dust (such as teeth abrasion or dust pneumonia), vehicular movement and road kills, and noise. The impacts would be expected to occur during Launch Facility and road modification, and cable trenching. The potential for vehicle collisions with livestock is somewhat higher in Wyoming where unfenced grazing lands are permitted. Thus, cattle are more likely to be found on roadways; traffic increases assume greater importance. The level of impact is low in the short term and negligible in the long term and not significant since construction activities are localized and in most cases opportunities exist for livestock to avoid the disturbances.

Impacts involving agricultural practices refer to field maintenance activities such as irrigation networks, erosion control measures, and range improvement programs. Two possible effects resulting from cable trenching were identified: 1) trenching through portions of fields could have the potential to affect the management possibilities of remaining lands; and 2) subsequent land improvements (such as stock ponding) after cable emplacement may require special design and placement modifications due to the presence of the buried cable. The impacts are considered to be low and not significant because they are localized, but present on site in the short term and of long duration since the effects continue through the life of the project.

Rural land use impacts refer to direct impacts related to cable routes, Launch Facilities, transporter/erector road modifications, and Quantity Distance zones. Launch Facility site and transporter/erector road modifications will have negligible direct impacts on rural land use. Small amounts of agricultural land adjacent to each Launch Facility may be affected in localized instances during construction activities and where agricultural land uses encroach upon road rights-of-way.

The Proposed Action cable routes (RB1, PA5, PA4, PA1, and SB1) could potentially affect approximately 338 acres of irrigated, dry farm, and rangeland uses. Table 2.1.10-1 shows existing land use conditions and potential impacts for cable corridors. Once cable placement and construction mitigation requirements are completed, landowners will have access to the cable easement for normal ranching and farming operations, although location marker poles installed after cable emplacement may interfere with equipment movement. While the project will be designed to ensure the speedy restoration of land surface, soil, productivity, and vegetative communities to disturbed areas, recovery from surface disturbance resulting from cable emplacement and return to preexisting productivity levels can take from 3 to 5 years (SCS 1983). This depends upon surface treatment, management and monitoring of ground restoration, and such external factors as weather and livestock and wildlife utilization. There will be an interruption of agricultural land uses during cable construction in the short term, but the character of the area will not be changed since cable trenching will be limited to a few areas and agricultural use will continue once the cable is in place. Therefore, the level of impact for the five Proposed Action cable routes will be low in the short term and negligible in the long term, and will not be significant.

For planning purposes, Quantity Distance requirements for the proposed project are 1,050 feet to public traffic routes and 1,750 feet to inhabited buildings. It is assumed that exemptions will be granted for public roads as is the case for the current Minuteman system. The Air Force will acquire a restrictive easement over the area from 1,200 feet (current easement) to 1,750 feet to preclude encroachment of inhabited buildings; however, other uses, such as agriculture and the use of agricultural buildings, will not be affected.

While future construction of inhabitable buildings will be absolutely prohibited over the easements, there are nine existing inhabited structures that require specialized consideration. These are residences associated with farm complexes which include additional uninhabited

farm support buildings. The Air Force has contacted these nine homeowners to inform them that they are within the Quantity Distance zones used for planning purposes. Once the final Quantity Distance is established, these nine homeowners will be informed in detail of the risks associated with their location. The homeowners were informed of the three options described below and invited to suggest others.

- 1) Sell the residence and the associated farm improvements to the Air Force, while keeping ownership of the land subject to the Air Force restrictive easement. The Air Force would pay fair market value for the structures and the reduction in the value of the property resulting from the easement. These values would be determined by professional appraisers from the local area if available, otherwise those familiar with the local realty market. The established values will be subject to negotiations with the owners. Relocation benefits would also be paid as authorized by law. The Air Force will commission and pay for the appraisals.
- 2) Sell only the house to the Air Force at its fair market value and use the proceeds to build a new residence outside the Quantity Distance area. The owner will be given the opportunity to move his present house outside the Quantity Distance area if he wishes.
- 3) Those families who would like to remain undisturbed may request to remain and the Air Force would process a request to the Secretary of the Air Force for an exemption. Each exemption request will be considered on a case-by-case basis. Each homeowner who wants to remain will be required to acknowledge in writing the nature of the circumstances for the establishment of the safety zone, that the Air Force is willing to acquire the structures and provide relocation assistance as provided by law, and a clear statement of his desire to remain nonetheless. The homeowner does not waive his legal rights by this action.

Although there will be a restriction on future residential use, agriculture and the use of agriculturally related (nonresidential) buildings could continue within the Quantity Distance zones. Since the character of the area will not change, there will be a low impact in the short term, continuing in long duration, at the site level. Impacts will not be significant. For further details see Section 3.1.5.4.3.2, social well-being.

#### 3.1.10.4.3 Consideration of Alternatives

There are three proposals for dispatch stations in the Deployment Area. The first includes two dispatch stations, one each in the northern and eastern portions of the Deployment Area. Although specific locations have not been identified for them, the EIS analyzed locations in the vicinity of Chugwater, Wyoming (northern area) and Kimball, Nebraska (eastern area) as representative communities for possible dispatch stations. This represents the Proposed Action. Alternatives to this action include either a single dispatch station in the eastern portion of the Deployment Area or no stations anywhere. Dispatch stations, ranging in size from 1 to 5 acres, may be established for the purpose of providing check-in points for personnel, vehicle dispatching, overnight parking for construction-related vehicles, and distribution of supplies. They will be temporary and consist of office space, enclosed storage space, and parking for up to 100 vehicles.

If designed for temporary use and located in an industrial or otherwise compatible area, the dispatch stations would have a negligible impact in the short and long term.

The five cable route corridors whose cumulative impacts represent a worst-case scenario (RB1, PD1, PA4, PA5, and SB2) could potentially affect approximately 510 acres of irrigated, dry farm, and rangeland. The impact ratings would generally be the same as for the Proposed Action (low in the short term, negligible in the long term, not significant) since there will be temporary interruptions of use but no change in the character of the area. The worst case would, however, affect more agricultural land.

Implementation of the R1 and R2 proposed road alternatives to achieve better and safer access to F.E. Warren AFB may involve raising either one or two bridges, lowering a roadbed, or using a realigned portion of Happy Jack Road. Applying the level of impact definitions for urban land use, the impacts for R1 and R2 will be negligible in the short and long term at the local level since vacant land will not be depleted and underutilization will not occur.

Alternative R3 will require approximately 8 acres of land for a new interchange at Round Top Road and Interstate 80. If the interchange were built and used largely by traffic generated by F.E. Warren AFB, it might be underutilized much of the time. The impact at the local level is low due to potential underutilization, and not significant.

### 3.1.10.5 Summary of Impacts

#### 3.1.10.5.1 Explanation of Detailed Impact Matrix
































Figure 3.1.10-1 presents the Land Use Summary Impact Matrix. Direct project-related rural land use impacts within the cable routes are low in the short term, negligible in the long term, and not significant. This is due to a short-term interruption of agricultural land use that will not change the character of the area, and the continuation in the long term of agricultural uses after cable trenching even though cable location poles may restrict equipment movement in isolated cases. Land use impacts involving Launch Facility site and transporter/erector road modifications are negligible in the short and long term. Quantity Distance zone impacts are low in the short term, of long duration, and not significant, since restrictions on residential land use will not change the overall agricultural character of the area.

Indirect project-related impacts to impedance of agricultural access are low in the short term, negligible in the long term, and significant because they have the potential to be highly controversial. Impacts to animal husbandry are low in the short term and negligible in the long term. Impacts to agricultural practices are not significant but low in the short term and of long duration, since potential interference with land improvements may occur for the life of the project.

Urban land use impacts on Cheyenne are low due to underutilization of a small amount of land devoted to mobile homes. Impacts on Wheatland are low because of underutilization of land used for multifamily uses. Impacts on both Cheyenne and Wheatland are negligible in the long term; however, housing demand in Cheyenne could promote infill, resulting in a long-term beneficial effect. The projected low impact on Kimball is generated in the short term and has a long duration, due to underutilization past 1990 of land used for mobile homes. The impact on Pine Bluffs is moderate in the short term and has a long duration, due to underutilization of multifamily and mobile home uses that exceeds the highest recent annual average residential vacancy rate. Impacts on Chugwater are negligible in the short and long term.

#### 3.1.10.5.2 Aggregation of Elements, Impacts, and Significance

The aggregated rating for land use (included in Figure 3.0-1) is low at the local level in the short term and is of long duration. It is not significant. Impacts are due to the potential for underutilization of developed land in Cheyenne, Wheatland, Kimball, and Pine Bluffs during the

LEGEND		ADVERSE IMPACTS	SIGNIFICANT ADVERSE IMPACTS	PROJECT IMPACTS					
LEVEL OF IMPACT *	LOW			SHORT TERM			LONG TERM		
	MODERATE			SITE	LOCAL	REGIONAL	SITE	LOCAL	REGIONAL
	HIGH								
POTENTIAL BENEFICIAL EFFECTS									
* MEASURE OF THE AMOUNT OF ENVIRONMENTAL CHANGE									
LAND USE									
Urban Land Use									
Cheyenne, Wyoming									
Wheatland, Wyoming									
Kimball, Nebraska									
Pine Bluffs, Wyoming									
Chugwater, Wyoming									
Rural Land Use									
Cable Routes									
Launch Facilities									
T/E Road Modifications									
Quantity Distance Zones									
Agriculture									
Impedance of Access									
Animal Husbandry									
Agricultural Practices									

<sup>1</sup> Impacts are those generated by construction activities and having a long duration.

<sup>2</sup> Impacts are those generated by construction activities and having a long duration as well as those generated only by operational activities.

FIGURE 3.1.10-1 LAND USE SUMMARY IMPACT MATRIX

project's population decline cycle. Project-related housing demand in Cheyenne could promote infill, resulting in a long-term beneficial impact on urban land use overall. At the site level, impacts are low for the cable routes, impedance of access, animal husbandry, agricultural practices, and Quantity Distance zones, and negligible for Launch Facility and transporter/erector road modifications. They drop to negligible in the long term for all aspects except the Quantity Distance zones and agricultural practices, where they remain low due to restriction of residential uses and agricultural land improvements. Access impacts are significant at the site level. The overall rating has been reached through a qualitative averaging of the element and subelement ratings given in Figure 3.1.10-1. At the site level, rural land use and agricultural impacts are not significant overall but low in both the short and long term since the impacts are expected to continue for the life of the project.

#### 3.1.10.5.3 Alternatives Matrix

The Proposed Action routes will all have low impacts due to the temporary interruption of agricultural land use. Approximately 338 acres of agricultural land will be temporarily affected - not enough to change the character of the area.

The six alternative cable routes will have the same overall ratings as the Proposed Action, but could potentially affect more agricultural land approximately 482 acres -still not enough to affect the character of the area. The five worst-case routes could affect 510 acres.

Impacts resulting from the R1 and R2 alternative road configurations will be negligible, short term, and not significant since they will involve use of a minor roadway realignment, bridge removal, or bridge raising only. Alternative R3 will have a low short and long-term impact due to the requirement for a new interchange which could be underutilized. The impact is not significant.

The dispatch station alternatives will have a negligible impact if designed for temporary use and located in industrial areas or areas where they are compatible with existing uses.

#### 3.1.10.6 Mitigation Measures

##### 3.1.10.6.1 Urban Land Use and Planning

Mitigation measures for both urban and rural land use are listed for consideration below. For urban, these measures are designed to strengthen the overall management and policy positions of local decisionmakers in relation to the land development and approval process. Mitigation measures could be effective in discouraging speculative platting, overbuilding, and leapfrog development, all of which have already occurred in the Cheyenne Urban Area and which could be exacerbated by the project. Each measure identifies the party responsible to implement, but not necessarily to pay for, the measure.

- o Development of a program to monitor land use and land development activities in the Cheyenne Urban Area. This measure would be effective in reinforcing mitigation measures by providing information to be used in local planning and decisionmaking and, if selected, should be implemented in 1984 prior to project construction. The implementing agency is the Cheyenne-Laramie County Regional Planning Office.
- o Implementation of existing local annexation policies, development plans, and incentives to encourage infill and orderly growth. This would be effective in reducing leap-frog development and associated public costs and, if selected,

should be implemented when development applications are processed. The implementing agency is the Cheyenne-Laramie County Regional Planning Office, the City of Cheyenne, and Laramie County.

- o Strengthening of local development regulations, design standards, and zoning in relation to mobile home parks in the Cheyenne Urban Area. This would be effective in assuring that mobile home development in response to the project will be of a high quality, and more readily absorbed. If selected, this should be implemented in 1984 before project construction. The implementing agency is the Cheyenne-Laramie County Regional Planning Office.
- o Strengthening of subdivision and development regulations in the Cheyenne Urban Area in order to: 1) make sure that prior to platting, design and engineering studies have determined that utilities and storm drainage can be provided by the developer or the responsible jurisdiction at a reasonable cost and in a timely manner; and 2) require an economic feasibility study for proposed development. This would be effective in discouraging speculative platting and building (which could result in underutilization of developed land) due to the project and, if selected, should be implemented in 1984 before project construction. The implementing agency is the Cheyenne-Laramie County Regional Planning Office.
- o Updating of the Pine Bluffs comprehensive plan and review of the adequacy of existing development regulations and controls in relation to the project. This would be effective in assuring that project-related development will be a long-term benefit to the community and compatible with existing uses and current community objectives. If selected, this should be implemented in 1985 before project impacts are projected to occur. The implementing parties are town officials.

#### 3.1.10.6.2 Rural Land Use and Agriculture

The mitigation measures for rural land use and agriculture that could be implemented by the Air Force include:

- o Schedule cable placement through sensitive cropland after harvest and before planting periods whenever possible to minimize crop damage. This will be effective in minimizing disruption of agricultural activities and loss of crops. If selected, it would be implemented at the beginning of (and continued throughout) the cable emplacement phase.
- o Minimize the placement of cables through irrigated cropland, especially center pivot systems and furrow networks. This will effectively minimize the kind of erosion and disruption of irrigation systems that can arise from disturbance of irrigated cropland. Additionally, avoidance of center pivot systems will reduce any damage to these expensive systems and minimize loss of the high yield crops they irrigate. If selected, the measure would be implemented during the design phase of the cable system.
- o Locate cable routes away from watering holes, mineral blocks, livestock feeding areas, calving and lambing grounds, and any other places where livestock tend to concentrate. This measure should effectively protect herds by minimizing impacts indirectly due to construction activities (i.e., falling in trenches) and any impacts due to stress, such as weight loss or reduction in reproduction. This measure would be implemented during the cable system design phase.



- o Restrict access to open cable trenches by covering them or providing trench barriers. This measure will effectively eliminate the hazard posed to livestock and landowners. If chosen, the measure would be implemented during cable construction.
- o Should road construction activities obstruct or potentially obstruct road access for combines, seeding equipment, and/or grain or livestock transport vehicles during critical times of the year, the Air Force or appropriate contractor will adjust construction activities to permit harvest, planting, or market transport to proceed on schedule.
- o Institute a land reclamation program consistent with state and federal guidelines for reclamation of surface disturbed lands due to cable trenching. This measure would effectively mitigate surface erosion effects of project development and restore equivalent forage plants and productivity. The measure would be instituted immediately after completion of all construction activities.
- o Provide an onsite coordinator during project construction activities, one of whose activities will be to ensure that gate enclosures are maintained and livestock cannot stray. The coordinator would be required during the construction phase when activities are occurring on grazing lands.

#### **3.1.10.7     Unavoidable Adverse Impacts**

Once cable emplacement is completed, surface identification posts (situated at varying distances depending upon topographic conditions), will be permanently installed to mark cable location. An unavoidable adverse impact to rural land use and agriculture is thereby created since some restriction upon equipment movement and land uses around the poles can be anticipated.

An additional unavoidable adverse impact may result from cable emplacement. Agricultural improvement activities, such as land leveling, terracing, and placement of canals, pipelines, tile drains, or water impoundments, may be limited because of the presence of the cable. Thus, cable emplacement may result in some additional design and location requirements that would not be required were cables not present.

There will be no unavoidable adverse impacts for urban land use.

#### **3.1.10.8     Irreversible and Irretrievable Resource Commitments**

Because all rural land disturbances will be temporary and agricultural operators compensated for crop and livestock losses, there will be no irreversible or irretrievable resource commitments for agricultural land use.

There will be no irreversible or irretrievable resource commitments for urban land use.

**3.1.10.9     The Relationship Between Local Short-Term Use of Man's Environment  
and Maintenance and Enhancement of Long-Term Productivity**

Agricultural productivity at the cable sites would be reduced in the short term, although loss to operators would be compensated. The intent of the project is to maintain and enhance long-term productivity of the resource through implementation of appropriate mitigation measures.

For urban land use, development of vacant lands could occur sooner than might otherwise occur, but existing development patterns and character would likely be maintained.

### **3.1.11      Recreation**

#### **3.1.11.1    Introduction**

This section describes the impacts of the Proposed Action on both regional and local recreation. A description of the criteria used to classify impacts and determine their significance is contained in the following sections.

The Area of Concentrated Study for the regional recreation analysis was determined from conversations with federal and state recreation planners, as well as from available visitation data pertaining to visitor origins. These sources suggested that the majority of recreational participation originating in the western portion of the Region of Influence where the greatest number of immigrants will settle occurs within the Wyoming counties of Laramie, Albany, Platte, Goshen, and Carbon. Recreation experts in the area advise that Wyoming residents generally do not travel to Colorado or Nebraska recreation areas for most outdoor activities.

The Area of Concentrated Study for local recreation, which includes the Cheyenne Urban Area, the city of Kimball, and the towns of Wheatland, Pine Bluffs, and Chugwater, accounts for those communities that are anticipated to experience the highest levels of population influx.

The information in this section is based upon data and detailed analysis contained in the Land Use Environmental Planning Technical Report.

#### **3.1.11.2    Definitions of Levels of Impact**

##### **3.1.11.2.1    Regional Recreation**

Levels of impact definitions for regional recreation areas are based on changes in the perceived quality of the recreational experience at those areas. The changes in perceived quality are, in turn, associated with project-related increases in population and the relative ability of recreation areas to absorb increases in recreational participation demand. Problems such as overcrowding, activity conflicts, traffic congestion, littering, loss of serenity, law violations, etc., are all linked to increases in visitation and can result in declines in the perceived quality of the recreational experience.

The levels of impact associated with regional recreation are:

- o      **Negligible Impact** - Will result in immeasurable, minimal, or no effects on the perceived quality of the recreational experience.
- o      **Low Impact** - Will result in increased visitation pressure but without a noticeable decline in the perceived quality of the recreational experience.
- o      **Moderate Impact** - Will result in an occasional noticeable decline in the perceived quality of the recreational experience.
- o      **High Impact** - Will result in a frequent noticeable decline in the perceived quality of the recreational experience.

##### **3.1.11.2.2    Local Recreation**

Local recreation impacts are defined in terms of the additional incremental load on parkland, recreational facilities, and staffing over projected baseline conditions.

**The level of impact definitions for local recreation are:**

- o Negligible Impact – Will result in minor impacts not requiring any new parkland, facilities, or staffing above projected baseline values. No capital expenditures or increases in operations or maintenance costs will be required.**
- o Low Impact – Will result in impacts not requiring any additional parkland, facilities, or staff. No capital expenditures will be required, but there will be increased operations and maintenance costs.**
- o Moderate Impact – Will result in impacts requiring redesign of existing parkland, additional part-time staff, or upgrading of existing facilities. Capital expenditures will be required for upgrading parks and/or facilities, as well as increased operations and maintenance costs.**
- o High Impact – Will result in impacts requiring the construction or purchase of new facilities, additional full-time staff, or the purchase of additional parkland. Capital expenditures will be required for acquisition or development of parkland and/or facilities, and operations and maintenance costs will increase.**

### **3.1.11.3 Determination of Significance Criteria**

**Significance is a function of the level of impact and its interaction within the context in which the impact occurs. For recreation, any one or a combination of the following could determine significance:**

- o Whether the impact affects public health or safety;**
- o Whether the impact is likely to be highly controversial;**
- o Whether the action and its impact may establish a precedent for future actions with significant effects or represent a decision in principle about a future consideration or policy;**
- o Whether the action or its impact challenges or threatens the violation of some federal, state, or local law or requirement imposed for the protection of the environment; and**
- o Whether institutional response to the impact will need to be extensive.**

#### **3.1.11.3.1 Regional Recreation**

**For regional recreation, an impact is significant if it affects public health or safety. Safety is related to the potential for injury to oneself or others resulting from conflicting goals of users. These conflicts are likely to intensify with increased use and crowding. Unsafe conditions most often occur when space is limited for an activity and there is too much demand for that space, or when the same space is used for conflicting activities.**

#### **3.1.11.3.2 Local Recreation**

**The determination of whether an impact within the overall local parks and recreation system would be considered significant is based on the ability of the system to provide recreational opportunities at levels that do not fall below existing conditions and/or threshold standards. An impact that would have little or no effect on the ability of institutions to provide services at**

an existing or standard level would be considered not significant. It would be significant if major agency responses such as raising taxes, floating a bond issue, or creating a special assessment district, were required to respond to identified need.

#### **3.1.11.4     Assumptions, Assumed Mitigations, and Environmental Impacts of the Proposed Action and Project Alternatives**

**Assumptions.** The regional recreation analysis assumed that existing levels of use at recreational areas within the Area of Concentrated Study and Region of Influence would continue under the No Action scenario. However, due to data unit inconsistencies (e.g., activity days versus visitor days) that exist between various sets of data, statistical manipulation was required to present all estimates in comparable terms. Activity-day units were selected for defining baseline visitation values. An activity day is defined as a single occurrence of a recreational activity lasting for any period of time up to 12 hours. The term is synonymous with participation day.

The immigrant population was assumed to have unique characteristics, therefore, the age structure of that population was incorporated into the methodology for assigning per capita participation rates. These rates, which were available by age group, were derived from a report prepared by the Water Resources Research Institute at the University of Wyoming (Carlson and Phillips 1980). Using these rates, it was possible to estimate total recreation demand, in activity days, that would be generated by project-induced population in the cities of Cheyenne, Wheatland, and Torrington (the three communities that together account for the largest annual average immigrant population in absolute numbers during project peak year). A computerized gravity model allocated total induced participation pressure, by activity, to the individual recreation areas within the Region of Influence.

For the local recreation baseline analysis, it was assumed that recreation participation is, for the most part, directly proportional to growth in population. For the local recreation impact analysis, the same University of Wyoming report was used to compare immigrant participation rates to those of current residents. Adopted state and national standards and existing ratios were applied to baseline and projected impact population figures for the various urban areas to determine whether improvements or additions to existing recreation systems were necessary.

**Assumed Mitigations.** There are no assumed mitigations for either regional or local recreation.

**Environmental Impacts.** Environmental impacts of the Proposed Action and project alternatives are discussed in the following subsections.

##### **3.1.11.4.1     Regional Recreation**

###### **3.1.11.4.1.1     Baseline Future - No Action Alternative**

In terms of activity days, Medicine Bow National Forest will exceed all other recreation areas in the Area of Concentrated Study by a ratio of 2.5 to 1.0 under assumed baseline conditions. The Medicine Bow Unit of the Forest will remain the most utilized area for all activities. Wyoming state parks, especially Glendo, will continue to have a relatively high level of utilization, while activity days of use at most Wyoming game and fish areas will continue to be low (with the exception of Lake Hattie, Twin Buttes Reservoir, and Wheatland Reservoir No. 3). Sloans Lake will also continue to be popular at a local level.

#### 3.1.11.4.1.2 Proposed Action

Since the forecast increase in recreational pressure over baseline in the project peak year (1987) is more than three times larger than in the settlement year (1991), only the impacts occurring during the peak year are described. Long-term impacts are generally low and not significant. Recreational pressure is expressed in activity days and reflects recreational demand. It may not necessarily translate to actual activity. Hunting pressure, for example, may be mediated by limiting the number of licenses issued.

Within the Area of Concentrated Study, the greatest absolute increase in recreational pressure attributable to project-induced population in the region will occur at Medicine Bow National Forest. More than half of this increase is expected at the Pole Mountain Unit due to its proximity to Cheyenne, while most of the remaining increase occurs at the Medicine Bow Unit. Hunting experiences the greatest increase in pressure at the Pole Mountain Unit with an increase of 8.6 percent over baseline activity days. Swimming shows the largest increase at the Medicine Bow Unit (3.2 percent over baseline). Percentages are intended to show the relative increase in recreational pressure. Absolute increases in pressure should be viewed in the context of the relative increases.

Other activities expected to increase over baseline use at the Pole Mountain Unit are hiking/horseback riding (3.5 percent), snowmobiling/cross-country skiing (3.4 percent), fishing (3.2 percent), picnicking (2.4 percent), and camping (1.8 percent). The percentage increases in pressure for these same activities at the Medicine Bow Unit are 1.1 percent or less. These increases will have a low, not significant impact on the quality of the recreational experience during the short term since many of the developed areas within the Forest are below capacity much of the year.

Of the four state parks within the Area of Concentrated Study, Curt Gowdy is expected to receive the greatest increase in visitation, since it is closest to Cheyenne. The percentage increases in recreation pressure over baseline use are relatively high for all activities: fishing (6 percent), hiking/horseback riding (6.5 percent), boating (6 percent), picnicking (4.5 percent), and camping (3.3 percent). These increases are projected to be considerably lower at Glendo and Guernsey with the greatest increases occurring in swimming (3.3 percent and 3.5 percent, respectively). Since all areas except Seminoe are virtually at capacity during peak-holiday weekends, increases are likely to result in additional demand during the project peak year. This would create a moderate and significant impact because there would occasionally be noticeable declines in the perceived quality of the recreational experience. Impacts on Seminoe would be minor.

Only five of the game and fish areas within the Area of Concentrated Study are expected to receive recreation pressure increases of greater than 200 activity days during the peak year. These include Lake Hattie, Twin Buttes Reservoir, Springer Wildlife Unit, Wheatland Reservoir No. 3, and Johnson Reservoir No. 3. In all but seven game and fish areas, the largest absolute increase is in fishing. At Rawhide Creek, Wick Brothers Big Game Unit, and Springer, Table Mountain, Pennock, and Laramie Peak wildlife units, hunting shows the greatest increase in pressure. At Greyrocks Reservoir, hunting and fishing exhibit equal pressure increases. The modest increases at most of these areas result in a negligible impact.

Of the other areas within the Area of Concentrated Study, the one expected to receive the most increased recreation pressure from project-related population is Sloans Lake. Most of that pressure is related to swimming, since this resource provides the city with its closest outdoor swimming opportunity. The 9-percent increase projected for that activity during the peak year is likely to magnify already crowded conditions at the beach, thereby causing a moderate and significant impact. Impacts are considered significant because they may

aggravate a situation already identified as a problem. Areas that are currently overcrowded cannot accommodate additional recreational use without causing competition for space for conflicting activities or overuse for the same activity, thereby creating a potential hazard to public safety.

#### 3.1.11.4.2 Local Recreation

##### 3.1.11.4.2.1 Baseline Future - No Action Alternative

For study purposes, both participation rates and usage patterns were assumed to continue at their present rates for the foreseeable future. Baseline forecasts for the Cheyenne Urban Area show population increases of 12,330 people or slightly less than 20 percent from 1983 to 1992. The largest increase is 1,590 people, which occurs between 1990 and 1991. Cheyenne will not have sufficient parkland, facilities, or staff to see it through this period. To accommodate demand, the City will need to acquire approximately 74 acres of parkland, increase its staff by approximately 20 percent, and construct additional softball, baseball, tennis, and volleyball facilities. Kimball, Wheatland, Pine Bluffs, and Chugwater have sufficient parkland and facilities to accommodate baseline growth. Wheatland will also need to increase its operations and maintenance staff by approximately 20 percent during this period.

##### 3.1.11.4.2.2 Proposed Action

Cheyenne's project-related population forecast for the peak year (1987) is 2,625. This number decreases to less than 950 by the settlement year (1992). For this reason the majority of the Proposed Action discussion concerns itself with peak-year conditions. Since project-related population increases are concentrated in approximately 8 years, long-term impacts are expected to be low and not significant.

The majority of local recreation impacts in Cheyenne occur because certain facility undersupplies currently exist in the system. Total parkland demand during peak year (including baseline and impact) is 435 acres. This demand exceeds Cheyenne's current parkland base of 372.5 acres, creating a need for 62.5 acres of developed parkland. Of this need, 15.8 acres are attributable to the project. The remaining 46.7 acres represent baseline demand through the peak year (1983 to 1987). In the short term, this is a high and significant impact because it would require extensive institutional response (approximately \$1 million in capital expenditures).

Peak-year staffing demand will require an additional 3.4 persons beyond baseline need. Impact demand will decrease to 3.1 additional staff persons in 1988 and 1.2 in 1992. These staff shortages could be dealt with by creating additional part-time positions during periods of high demand. This short-term impact will be moderate and not significant.

Cheyenne's recreation facilities will receive increased pressure from the immigrant population. During the peak year there will be a temporary demand for additional baseball (one field), softball (one field), volleyball (one court), and tennis (one court) facilities. As with staffing, this demand will decrease to 35 percent of peak-year demand by 1992. This short-term impact will be moderate and significant because it will require an extensive fiscal response of the same nature as that required for parkland.

Project development associated with the city of Kimball and the towns of Wheatland, Pine Bluffs, and Chugwater will produce modest population increases for short periods of time (less than 3 years in all cases).

Population increases in Wheatland are forecast to occur over a 3-year period, peaking in 1986 (450 people). Increases in Kimball are forecast to occur over a 2-year period, peaking in 1989 (300 people). Project-related population increases will not create a demand for additional development of parkland or facilities in these communities. Additional maintenance of parkland and facilities will be necessary, and an additional part-time position will likely be required in both of these communities. These short-term impacts would be moderate and not significant because they would not require extensive fiscal response.

Project-related population in Pine Bluffs will number 150 people in 1988. This short-term population increase will not create demand for parkland, facilities, or staff beyond that already provided within the community. Additional parkland and facility maintenance, however, will be required as a result of the project. This short-term impact will be low and not significant.

Small population increases in Chugwater (50 people peak year) are expected to occur over a 3-year period (1985 to 1987). These increases will not create a demand for parkland, facilities, staffing, or maintenance beyond those already provided. Project-related impacts are expected to be negligible.

#### 3.1.11.4.3 Consideration of Alternatives

Since alternative dispatch stations, roads, and cable system routes do not affect parkland or recreational facilities, no impacts on public recreation are anticipated due to the alternatives.

#### 3.1.11.5 Summary of Impacts

##### 3.1.11.5.1 Explanation of Detailed Impact Matrix

The impact level and significance matrix for recreation (Figure 3.1.11-1) shows that there will be a moderate and significant impact on both local and regional recreation systems during the short term. The impact on both systems is low and not significant over the long term.

##### 3.1.11.5.2 Aggregation of Elements, Impacts, and Significance

Included in Figure 3.0-1 is the aggregation of impacts for recreation. The aggregated rating for the overall resource is moderate and significant at both the local and regional levels in the short term, and low and not significant in the long term. The site level is not relevant to recreation.

This overall rating has been reached through a professionally judged, qualitative averaging of the two subelements comprising the recreation resource. The subelement ratings are found in Figure 3.1.11-1.

Under the regional heading of the matrix, the level and significance of impacts are based entirely on the regional recreation analysis, while under the local column, the determination depends on the results of the local analysis only. Impacts at the regional level are moderate because there are already facilities that virtually reach peak capacity on certain seasonal and holiday weekends and any additional use exacerbates an existing overcrowded situation thereby contributing to a noticeable decline in the perceived quality of the recreational experience. Moderate impacts are significant because additional recreational demand contributes to a competition for space among conflicting activities or overuse for the same activity, thus creating a potential hazard to public safety.




LEGEND		ADVERSE IMPACTS	SIGNIFICANT ADVERSE IMPACTS	PROJECT IMPACTS									
LEVEL OF IMPACT *	LOW	○	●	SHORT TERM			LONG TERM						
	MODERATE	○	●	SITE	LOCAL	REGIONAL	SITE	LOCAL	REGIONAL				
	HIGH	○	●										
POTENTIAL BENEFICIAL EFFECTS													
* MEASURE OF THE AMOUNT OF ENVIRONMENTAL CHANGE													
RECREATION					●	●		○	○				
Regional Recreation						●			○				
Quality of Recreational Experience						●			○				
Local Recreation					●			○					
Parkland					●			○					
Staffing					○			○					
Facilities					●			○					

FIGURE 3.1.11-1 RECREATION SUMMARY IMPACT MATRIX

Local recreation comprises three components: parkland, facilities, and staff. Impacts to parkland are judged high and significant, to recreation facilities moderate and significant, and to staff moderate and not significant. The high determination is localized to the need for additional parkland in certain Cheyenne neighborhoods only and not to the city as a whole. Therefore, an overall rating of moderate is more representative of the potential impacts. The significance determination is related to the need for an extensive fiscal response on the part of local government to provide additional parkland or recreation facilities. The need for additional staff is not deemed to require a major financial outlay and is, therefore, not significant.

### 3.1.11.6 Mitigation Measures

#### 3.1.11.6.1 Regional Recreation

Mitigation measures are designed to eliminate or minimize the problems associated with increased visitation at regional recreation areas. The mitigation measures listed below identify the party to implement, but not necessarily to pay for, the measure.

- o Implement an environmental awareness program to educate project-related immigrants about problems associated with poaching, illegal fishing, vandalism, violation of park regulations, off-road vehicle abuse, etc. This mitigation measure would be effective in controlling the number of occurrences that could result in impacts to recreational and other environmental resources, and, if selected, would be implemented by spring 1985. The implementing agency is the Air Force in association with state and federal recreation agencies.
- o Design an advertising and promotional campaign to promote public awareness of and interest in recreational areas that currently sustain lower user pressures than more popular areas. This type of campaign could include the use of printed materials, radio and television, and referrals by recreational agencies. This mitigation measure would aid in reducing the impact to the quality of the recreational experience and law enforcement problems at already heavily utilized areas and, if selected, would be implemented by spring 1985. The implementing agencies are the Wyoming Recreation Commission, the Wyoming Game and Fish Department, and the U.S. Forest Service.
- o Encourage the development of Upper North Crow Reservoir to attract usage from heavily utilized areas located nearby, such as Curt Gowdy State Park and the Pole Mountain Unit of Medicine Bow National Forest. The provision of better access roads and signing would aid in this goal. This mitigation measure would reduce the impact to the quality of the recreational experience and law enforcement problems at already heavily utilized areas and, if selected, would be considered immediately and implemented at some time before peak year 1987. The implementing agency is the Cheyenne Board of Public Utilities in conjunction with state and federal recreation agencies.
- o Develop management techniques to control the number of people entering already overcrowded facilities. Specifically, control access to and from facilities during peak periods through the use of automated gates with a car counter. Uncontrolled roads could be blocked during peak periods. A less expensive but less effective approach might be to post overcrowding notices on entrance roads with recommendations for alternative sites. This mitigation measure would aid in reducing the impact to the quality of the recreational experience and law enforcement problems at already heavily utilized areas and, if selected, would be implemented at some time before peak year 1987. The

implementing agency is variable depending upon the jurisdiction of each area, but would most likely include the Wyoming Recreation Commission and the U.S. Forest Service.

- o Implement a monitoring program to continue throughout the project deployment period to assess changes in conditions and use patterns at major recreational areas within the region. This mitigation measure would aid in the identification of new or upgraded mitigation methods that may be required to prevent deterioration of critical parameters, such as the quality of the recreational experience and law enforcement problems and, if selected, would be implemented immediately in order to establish a before-project basis for comparison. The implementing agency is variable depending upon the jurisdiction of each area, but would most likely include the Wyoming Recreation Commission and the U.S. Forest Service.
- o Increase the number of law enforcement patrols through recreational areas by the appropriate county sheriff's office, particularly with respect to Curt Gowdy State Park and Medicine Bow National Forest (Pole Mountain Unit). This mitigation measure would aid in deterring criminal violations and other matters falling within the jurisdiction of the sheriff's office and, if selected, should be implemented by spring 1985. The implementing agency is the Wyoming Recreation Commission and the U.S. Forest Service in cooperation with the county sheriffs' offices.
- o Modify the existing state park regulations to protect against long-term camping at Curt Gowdy and other state parks. For instance, a requirement that seasonal camping permits may be used for 2-week periods at a time with at least 5 days between periods could be implemented. A color-coded, dated tagging system could be employed. The system would require a camper to pick up a tag before using a campground, display it while there, and turn it in at the end of his stay. This mitigation measure would effectively eliminate the potential for long-term camping at nearby state parks for all seasonal permit holders and, if selected, would be implemented in spring 1985. The implementing agency for this mitigation measure is the Wyoming Recreation Commission.
- o Develop a temporary housing referral program for needy transients coming into the region during the project construction period. This program would identify local service agencies that are available to house such transients. A further referral program in the case of overburdened service organizations is proposed in Section 3.1.6.6 of the FEIS and in the Public Services and Facilities portion of the Jurisdictional EPTR. This mitigation measure would reduce the potential for transient immigrants to set up residence at nearby recreational areas and, if selected, would be implemented in early spring 1985. The implementing agencies are Laramie County School District No. 1, county agencies, and the City of Cheyenne.
- o Consider the development of the new section of land adjacent to Curt Gowdy State Park that was recently purchased by the state for park expansion. This mitigation measure would effectively reduce impacts on the quality of the recreational experience at the park due to increased visitation and, if selected, would be implemented by spring 1985. The implementing agency is the Wyoming Recreation Commission.

### **3.1.11.6.2      Local Recreation**

The provision of parkland, recreation facilities, and staffing outside the Cheyenne city limits cannot be accomplished by a single entity. Laramie County, for example, lacks the institutional structures to maintain recreational facilities. The following options are offered as possible solutions.

- o Consider use of special recreation districts to support county recreation facilities (Laramie County Recreation Planning Advisory Committee and Greater Cheyenne Recreation Commission).
- o Consider City/County joint venture development of recreation facilities outside city boundaries. The County would provide land and law enforcement; the City would maintain the facilities on a contractual basis with the County. Development of facilities would be a shared responsibility (Laramie County Recreation Planning Advisory Commission, Greater Cheyenne Recreation Commission, and the Cheyenne Parks and Recreation Department).
- o Consider City/School District joint venture development of recreation facilities. The School District would provide land and a portion of the facilities; the City would provide a portion of the facilities and maintain both the grounds and facilities (Laramie County School District No. 1, Greater Cheyenne Recreation Commission, and the Cheyenne Parks and Recreation Department).
- o Consider City/Laramie County Community College joint venture development of recreation facilities. This option would be similar to joint development between the City and the School District. The Community College would provide land, the City would provide maintenance, and facility development costs would be borne by both parties (Laramie County Community College, Greater Cheyenne Recreation Commission, and the Cheyenne Parks and Recreation Department).

Mitigation measures are designed to eliminate or minimize the problems associated with increased use of local recreation facilities. The mitigation measures listed below identify the party responsible to implement, but not necessarily to pay for, the measure

- o Analyze facility utilization to determine whether rescheduling or minor upgrading (e.g., lighting ballfields or irrigation of fields) might ease impacts. This mitigation would be effective in accommodating the increased demand for facilities created by the project and help prevent damage to existing facilities (e.g., turf). If selected, this mitigation measure would be implemented immediately by the Cheyenne Parks and Recreation Department
- o Adopt an incremental fee structure for programs and classes so that an equal percentage of the costs are borne by non-city residents. This mitigation would be effective in providing additional revenue for the Cheyenne Parks and Recreation Department which, in turn, would reduce the pressures placed on the Department by noncity residents. If selected, this mitigation measure would be adopted immediately by the Cheyenne Parks and Recreation Department
- o Develop short-term recreation programs for the nonmilitary (Assembly and Checkout) immigrant population. This mitigation measure would be effective in reducing the pressures placed on city recreation facilities during the peak period.

If selected, this mitigation measure would be implemented by the Air Force in coordination with its contractors and the Greater Cheyenne Recreation Commission in 1985 and should be continued through 1989.

- o Develop a joint venture City/School District neighborhood park at Anderson School. This mitigation measure would alleviate the pressure created by the more than 400 persons (peak year) expected to locate in the Frontier Mall neighborhood. If selected, this mitigation measure would be implemented immediately by the Cheyenne Parks and Recreation Department and Laramie County School District No. 1 to coincide with the completion of Anderson School.
- o Expand Sunnyside Park to at least 5 acres and provide the developed facilities commonly found in a neighborhood park. This mitigation measure would alleviate the pressure created by the more than 350 persons (peak year) expected to locate in the Dildine neighborhood. If selected, this mitigation would be implemented by the Cheyenne Parks and Recreation Department no later than the first quarter of 1985.
- o Expand Sun Valley Community Park to at least 30 acres and provide the developed facilities commonly found in community and neighborhood parks. This mitigation would alleviate the pressure created by the more than 300 persons (peak year) expected to locate in the Grandview neighborhood. In addition, this mitigation measure would reduce the impacts on existing community parks resulting from those immigrants located in the Frontier Mall, Dildine, and Grandview neighborhoods. If selected, this mitigation measure would be implemented by the Cheyenne Parks and Recreation Department by the first quarter of 1985.
- o Develop a joint venture community/neighborhood park to serve the neighborhoods of Orchard Valley and Waltersheid. This mitigation measure would alleviate the pressures created by the more than 500 persons (peak year) expected to locate in those neighborhoods. If selected, this mitigation measure would be implemented by the Cheyenne Parks and Recreation Planning Advisory Committee in the first quarter of 1984.

#### **3.1.11.7    Unavoidable Adverse Impacts**

There are no unavoidable adverse impacts on recreational resources.

#### **3.1.11.8    Irreversible and Irretrievable Resource Commitments**

There are no irreversible and irretrievable resource commitments.

#### **3.1.11.9    The Relationship Between Local Short-Term Use of Man's Environment and Maintenance and Enhancement of Long-Term Productivity**

There will be no impact on maintenance and enhancement of long-term productivity due to local short-term use of recreational facilities.

### **3.1.12      Cultural and Paleontological Resources**

#### **3.1.12.1    Introduction**

This section describes the impacts of the Proposed Action on prehistoric, historic, and American Indian cultural resources, and paleontological resources. A description of the criteria used to arrive at the level and significance of project impacts is presented along with a discussion of the procedures employed in their estimation. An important part of this discussion is focused upon identifying those assumptions and assumed mitigations that condition the results of impact analyses. Following these introductory sections, an assessment of the level, significance, timing, and geographic extent of anticipated impacts is presented for each resource element; separate consideration also is given to each component of the project that could result in direct or indirect impacts. Both the No Action Alternative and the Proposed Action and its alternatives are considered. The section concludes with a consideration of unavoidable adverse impacts, irreversible and irretrievable resource commitments, and the relationship between local short-term use of man's environment and maintenance and enhancement of the long-term productivity of the cultural and paleontological resource base.

As noted in Section 2.1.12.1.1, two separate geographic areas are distinguished for the purpose of identifying and categorizing impacts to cultural and paleontological resources: 1) an Area of Concentrated Study within which impacts may occur directly from project activities; and 2) a Region of Influence, a larger area that is inclusive of the Area of Concentrated Study, in which impacts may occur indirectly from project activities. The Area of Concentrated Study actually consists of a mosaic of areas in which proposed project activities will directly result in ground disturbances and impacts to cultural and paleontological resources. These areas include portions of F.E. Warren AFB, the Defense Access Road rights-of-way, the buried cable paths, dispatch station sites, and the Launch Facilities, Launch Control Facilities, and their access roads. Although the number of individual elements involved in the Area of Concentrated Study is relatively large, the total area involved in project ground disturbances is estimated at approximately 1,700 acres, approximately two-thirds of which will occur along existing road rights-of-way.

The recognition of a separate Area of Concentrated Study and Region of Influence is tied to the kinds and locations of impacts expected as a consequence of project implementation. Because the specification of an Area of Concentrated Study and the effects that will occur within it are totally dependent upon facilities siting decisions associated with the Proposed Action, it is entirely possible to know the kinds and locations of impacts in advance of project implementation, and mitigations for most impacts can be developed and accomplished during project planning and design. On the other hand, impacts in the Region of Influence will, by definition, be of an indirect nature. Although data are available to arrive at reasoned qualitative ratings for level of indirect impacts, the specific resources (and their locations) subject to such impacts cannot be determined in advance. Consequently, proposals for mitigation measures involving the Region of Influence must be more general in their construction than those involving the Area of Concentrated Study.

The information in this section is based upon data and detailed analysis contained in the Cultural and Paleontological Resources Environmental Planning Technical Report.

### **3.1.12.2     Definition of Levels of Impact**

The level of impact to cultural and paleontological resources is a measure of the degree to which changes over and above baseline conditions can be anticipated from project activities. For the purpose of this assessment, four qualitative ratings are used to specify the level of impacts associated with the Proposed Action. These are defined as follows:

- o     **Negligible Impact** – Those instances in which the project will not affect resources possessing important scientific or humanistic values;
- o     **Low Impact** – Those instances in which the project will result in finite but minimal loss of resources possessing important scientific or humanistic values;
- o     **Moderate Impact** – Those instances in which the project will result in limited loss of resources possessing important scientific or humanistic values; and
- o     **High Impact** – Those instances in which the project will result in extensive loss of resources possessing important scientific or humanistic values.

Because the terms "minimal", "limited", and "extensive" are critical components of the level of impact rating definitions, consideration needs to be accorded to the meaning of these terms. In this regard, a "minimal" loss of resources possessing important scientific or humanistic values is one that results in the maintenance of a representative sample of the resource. For example, the loss of one or two archaeological sites out of a regional population of 100 of the same type would be considered a minimal loss and a consequent low impact. On the other hand, the loss of most or all of the sites of a given type would be considered a high impact because the resultant site sample would no longer be representative of the resource.

In addition to considering level of impact, predictions of project impacts on cultural and paleontological resources involve evaluating the type, timing, and scope of impacts to each resource element. For both cultural and paleontological resources, impacts might be either direct or indirect. Direct impacts result from disturbances occurring during project construction and operation that result in above or below-ground disturbances (e.g., modifications to structures and construction of road rights-of-way). Indirect impacts are those caused by induced development and altered land use patterns.

Timing of impacts can be classified as short term or long term. Short-term impacts are direct or indirect impacts occurring during the period of project construction when ground disturbance and associated population levels are at their maximum; short-term impacts may result in changes in baseline conditions that last beyond the period of project deployment. Long-term impacts consist of those direct or indirect impacts occurring as a consequence of project peacetime operations and/or those impacts occurring during project construction that carry over to project operations.

Scope of impacts refers to the geographic area within which project impacts are perceived or predicted. For purposes of the current analysis, three areal scales are recognized: 1) site, referring to specific localities within the Area of Concentrated Study; 2) local, encompassing municipalities, parks, and other planning or management jurisdictions proximal to the project area; and 3) regional, constituting the remaining area included in the Region of Influence.

### 3.1.12.3 Determination of Significance Criteria

Significant impacts to cultural resources are those that have adverse impacts on qualities and characteristics that make a prehistoric or historic cultural resource eligible for inclusion in the National Register or that make a site important to contemporary American Indian groups. Similarly, significant impacts to paleontological resources are those that have an adverse impact on the scientific importance of the resource.

### 3.1.12.4 Assumptions, Assumed Mitigations, and Environmental Impacts of the Proposed Action and Project Alternatives

In the sections that follow, the results of the analyses of project impacts are summarized for both the No Action Alternative and the Proposed Action and its alternatives. These analyses lead to the conclusion that the Proposed Action will have no significant adverse impacts to American Indian cultural resources and paleontological resources. Consequently, detailed impact analyses for these two resource elements are not included in this document; however, these impact analyses may be found in the Cultural and Paleontological Resources Environmental Planning Technical Report.

In general, analysis and specification of potential impacts to cultural and paleontological resources involves projecting known and anticipated project activities onto baseline conditions and applying the criteria outlined in Sections 3.1.12.2 and 3.1.12.3 to establish level and significance of impacts. The means of accomplishing these assessments included use of available inventory data, expected resource occurrences, assumed mitigation measures, and professional judgment. For each major set of activities entailed by the Proposed Action (e.g., onbase facilities modifications, Defense Access Roads upgrading), known and expected resources were compared with the design, siting, and construction characteristics of project features in order to establish the kind, intensity, scope, timing, and importance of likely impacts.

Where reliable resource data were available for a particular project element (e.g., onbase facilities modifications) and the characteristics of that project element were well specified (e.g., internal alterations to historic structures), impact assessments have a high degree of objectivity because they can be made from full knowledge of the resource and the activities that will impinge upon those resources. On the other hand, where inventory data are lacking (e.g., the buried cable paths) or the nature of a specific project element was unspecified (e.g., the precise locations of dispatch stations), the impact analyses depend to a greater degree upon extrapolations from current baseline data and professional judgment.

Impact analyses in the latter circumstances were more conservative in their approach; that is, estimates of impact levels in these circumstances are likely to be higher than those that would have been developed if complete baseline data had been available. For example, level of impact determinations for proposed buried cable paths could draw upon knowledge of the specific construction techniques and the general locations of proposed cable path alignments but had to rely upon extrapolations from inventory data obtained from areas outside these alignments. Consequently, these extrapolations assumed that resource densities along the paths would be equal to or greater than those noted by other researchers in similar environmental settings. A similar estimation method was used for level of impact ratings associated with proposed upgrading and widening of Defense Access Roads. On the other hand, estimates of the levels of indirect impacts associated with the project were based on the relatively small anticipated changes in regional baseline demographics and the lack of specific locational information about any changes that may affect important cultural or paleontological resources.



**Assumptions.** The analysis and characterization of project impacts incorporate certain key assumptions that condition the level and significance of impact assessments. These assumptions encompass a variety of perspectives ranging from attributions regarding the reliability of current inventory data to statements about the expected variability in ongoing, nonproject-related forces affecting resources.

These assumptions are as follows:

- o Existing resource inventory data, in conjunction with background research information, provide a reasonable approximation of the kinds of resources that may be expected to occur in areas for which inventory data are currently lacking.
- o Currently unrecorded or unevaluated resources exist within the Region of Influence and Area of Concentrated Study that possess important scientific and/or humanistic values (i.e., eligible for inclusion in the National Register).
- o The rate of ongoing natural and human factors affecting baseline conditions (e.g., erosion, agricultural practices, population growth, alteration and modifications of the built environment) will remain relatively unchanged for the foreseeable future.

**Assumed Mitigations.** For prehistoric and historic cultural resources Air Force policy is to:

- o Provide leadership in the preservation of the prehistoric and historic resources of the United States;
- o Assume responsibility for the preservation of historic properties under Air Force control;
- o Direct policies, plans, activities, and programs to the maximum extent possible to minimize harm to sites, structures, and objects listed in the National Register or eligible for listing;
- o Initiate procedures to assure that good faith consultation with the Advisory Council on Historic Preservation and appropriate State Historic Preservation Officers occurs prior to undertaking any action that could adversely affect sites, structures, and objects listed in the National Register or eligible for listing; and
- o Locate, inventory, and nominate to the Secretary of the Interior all sites, buildings, districts, and objects under Air Force jurisdiction that appear to qualify for listing in the National Register.

Based on these policies, the Air Force will, in consultation with the Advisory Council on Historic Preservation and the Wyoming and Nebraska State Historic Preservation Officers, develop and implement a Programmatic Memorandum of Agreement for the treatment of prehistoric and historic cultural resources affected by the Proposed Action; it also is assumed that resources under the jurisdiction of other agencies will be treated in a manner compatible with existing statutes and regulations. This agreement will specify preparation of a comprehensive cultural resources management plan for the Peacekeeper project. The plan will specify appropriate maintenance, rehabilitation, restoration, or reconstruction treatments of historic properties to be applied within the mission and budgetary constraints of the Air Force. This plan will include the following features:

- o Procedures for inventorying all cultural resources that potentially will be directly affected by the Proposed Action;

- o Procedures for evaluating cultural resources for National Register eligibility in accordance with criteria established in 36 CFR 60.6;
- o Procedures for monitoring project construction to ensure against loss of previously unrecorded resources that may be encountered during ground-disturbing activities;
- o Procedures for long-term monitoring of known resources under Air Force control to insure maintenance of resource integrity;
- o Procedures and guidelines for short and long-term curation of specimens and records resulting from all studies and investigations;
- o Procedures for allocating resources to particular use categories (e.g., data recovery, interpretation, preservation in place);
- o Resource-specific measures to restore, rehabilitate, retain and/or recover important cultural properties that will be impacted directly by the Proposed Action; and
- o Procedures for implementing, coordinating, and monitoring all action elements included within the management plan.

Two major categories of physical properties are included within cultural resources: 1) below-ground resources (e.g., archaeological sites) subject to impacts from ground disturbing construction activities; and 2) above-ground resources (e.g., historic structures and buildings) subject to impacts from facilities construction and modifications. Depending upon which category of resource is being considered, the resource-specific mitigations entailed by the Programmatic Memorandum of Agreement and the accompanying resource management plan will vary accordingly.

For below-ground or archaeological resources, the Air Force will develop and implement the following mitigation measures:

- o Avoid, where possible and practical, adverse impacts by facility redesign or engineering techniques;
- o Stabilize, in whole or in part, effected National Register listed or eligible archaeological resources that can be preserved in whole or in part;
- o Recover, analyze, evaluate, report, and provide curation for data from all Register-eligible sites disturbed or destroyed by construction activities;
- o Provide access to records and samples recovered as a consequence of mitigation studies for use in scientific research; and
- o Ensure that unrecorded, buried resources are afforded timely and appropriate evaluation and mitigation measures as part of a construction monitoring program.

These mitigation measures have been incorporated into the current analysis of impacts. Although they have no effect on the level of impacts associated with the project, these measures do have important consequences for assessments of impact significance. Implementation of assumed mitigations will make project-caused impacts to archaeological properties not significant.

For above-ground or architectural resources, mitigation of project-caused impacts will largely occur as part of the facilities design process. In this regard, the Air Force will develop and implement resource-specific measures within operational and budgetary constraints that specify appropriate inspection, maintenance, preservation, rehabilitation, and restoration treatments for buildings in accordance with the Secretary of the Interior's Standards for Historic Preservation Projects. These will expand upon the following Air Force commitments:

- o Functionally adaptive and compatible reuse of historic buildings within the District/Landmark will be considered before other siting alternatives.
- o New construction within the District/Landmark will be designed to be architecturally compatible with the existing historic environment as to siting, scale, mass, detail, material, texture, and color.
- o Alterations and additions to existing structures within the District/Landmark will be designed using the design vocabulary of the structure being altered or added to, and sited so as to minimize intrusion on the District/Landmark as a whole.
- o New construction outside the District/Landmark will be designed and sited so as to avoid or minimize intrusions on the District/Landmark.

Under the management plan for each project element impinging upon important architectural resources, a series of specific mitigation measures will be incorporated into the design criteria for that program element. These design criteria will be made a part of the Installation Planning and Design Guide for F.E. Warren AFB, which incorporates mitigations to environmental impacts in the design of the project and provides continuing guidance for construction at F.E. Warren AFB.

The program of mitigations outlined above for historic architectural resources conditions the current analysis, reducing both the level and significance of impacts. Indeed, implementation of the specific mitigation measures to be incorporated into the design guide will result in a net beneficial effect on this resource element. Circumstances may arise, however, in which facilities requirements may conflict with the historic preservation management objectives that have been developed for a particular resource. In such situations, it is possible that one or more building-specific mitigation measures may not be feasible and that significant impacts will result. The current analysis recognizes this and has incorporated its consequences into project impact determinations.

Environmental Impacts. The sections that follow present summary accounts of impacts to prehistoric and historic cultural resources associated with the various actions entailed by Peacekeeper deployment and peacetime operations. In the case of both resource elements, these discussions are preceded by a consideration of "baseline future" conditions and changes. These examinations of future trends in the resource in the absence of the project (the "No Action Alternative") provide the framework within which project impacts may be understood.

As noted previously, the analysis of impacts to cultural and paleontological resources involved projecting known and anticipated project requirements onto baseline future conditions to establish the nature of resultant changes (Table 3.1.12-1). In addition, assumed mitigations, which primarily affect impact significance, were overlaid onto these baseline changes to determine the net impact of the project.

Table 3.1.12-1

**PROJECT-CAUSED BASELINE CHANGES TO PREHISTORIC AND HISTORIC  
CULTURAL RESOURCES IN THE AREA OF CONCENTRATED STUDY**

<b>Project Element</b>	<b>Requirements</b>	<b>Baseline Changes</b>
<b><u>Facility Construction</u></b>		
Launch Facility Modifications, Quantity Distances, and Access Roads	Modifications to accept Peacekeeper missile and upgrade of access roads and maneuvering areas for stage transporter	Extending the Quantity Distance and widening and upgrading of access roads affecting historic and prehistoric sites
Add/Alter Energy Management Control System	Tie project facilities into Base Energy Management Control System	Installation of equipment and trenching affecting historic and prehistoric resources
Add/Alter Missile Maintenance Shops	Accommodations for Peacekeeper equipment maintenance	Additions and alterations affecting historic resources (Historic District and Bldg. 336)
Add/Alter Missile Support Facility	Space for missile guidance control system, maintenance and storage, and space for vehicle and equipment control branch	Additions and Alterations affecting historic resources (Historic District and Bldg. 332)
Alter Communication Maintenance Facility	Space for communication equipment	Alteration affecting Bldg. 1250
Alter Missile Maintenance Support Facility	Office space for technical personnel	Alteration affecting historic resource (Bldg. 340)
Alter Security Control Center	Increase space for Wing Security Control and consolidation of Security Police functions	Alteration affecting historic resource (Bldg. 34)
Heating Distribution Lines	Supply heat to Peacekeeper facilities	Trenching and other ground disturbance affecting pre-historic and historic resources
Integrated Support Complex	Temporary warehousing and office space for contractors and SATAF	New construction indirectly affecting historic resources (Bldgs. 801-806)
Launch Facility Trainer (Silo)	Training for missile maintenance personnel	New construction affecting Historic District/Landmark

Table 3.1.12-1, Continued, Page 2 of 2  
PROJECT-CAUSED BASELINE CHANGES

Project Element	Requirements	Baseline Changes
<u>Facility Construction, cont.</u>		
Miscellaneous Facility Alterations	Administration space for SATAF personnel	Modifications and alterations affecting historic resources (Bldgs. 152, 250, 330, 389)
Contractor Support Area Shops	Space for contractor equipment maintenance and repair	New construction affecting prehistoric and historic resources
Trainer and Instruction Facility	Training for missile maintenance personnel	New construction affecting Historic District/Landmark
Utilities: Sewage/Water	Water supply and sewage disposal for Peacekeeper facilities	Trenching and other ground disturbance affecting prehistoric and historic resources
Utilities: Power	Electrical power supply to Peacekeeper facilities	Trenching and other ground disturbance affecting prehistoric and historic resources
Stage Storage Area	Storage and handling of missile stages and special vehicle maintenance	New construction and other ground-disturbing activities
Weapons Storage Area	Assembly and storage of Reentry Systems	New construction and other ground-disturbing activities
<u>Stage Transporter Routes</u>		
Defense Access Roads	Stage transporter transportation network to Launch Facilities	Widening and upgrading of road surfaces and structures affecting prehistoric and historic resources
Onbase Roads	Access to and between onbase Peacekeeper facilities and egress from base	New construction and upgrading of existing roads affecting Historic District/Landmark and historic and prehistoric archaeological resources
<u>Dispatch Stations</u>	Contractor field storage and office space	Undetermined
<u>Cable Paths</u>	Command control and communication between missile flights	Trenching and other ground disturbances affecting prehistoric resources

#### 3.1.12.4.1 Prehistoric Cultural Resources

##### 3.1.12.4.1.1 Baseline Future - No Action Alternative

Nonproject-related changes to prehistoric cultural resources within the Region of Influence and Area of Concentrated Study will occur from a variety of natural and manmade causes. Although most trends mentioned here will result in an overall loss of resource values, certain actions may have beneficial effects.

One of the most important sources of degradation to the existing resource base is the ongoing natural erosion/decay that affects all physical properties exposed to the environment. This process is expected to continue into the future at a fairly uniform rate, and over the long term, will significantly diminish the scientific and/or humanistic value of the resource.

Both short and long-term degradation of the resource also will result from current and projected regional land use patterns. Housing construction, industrial and urban development, recreational use, agricultural practices, and the like all may contribute to the loss of scientific and humanistic values. Population projections indicate that increases can be expected in the number of people inhabiting the region during the coming years, and therefore, resource sites likely will be altered or destroyed at an increasing rate.

Ongoing and proposed construction of new facilities and modifications to existing structures at F.E. Warren AFB for non-Peacekeeper activities could cause loss of both known and unknown prehistoric resources. A recently completed archaeological inventory of selected portions of the base recorded 24 prehistoric sites within a relatively small area; therefore, it is concluded that virtually any onbase ground-disturbing activity has the potential for disturbing additional prehistoric cultural deposits.

##### 3.1.12.4.1.2 Proposed Action

Direct project impacts affecting important prehistoric cultural resources will occur as a result of construction activities associated with the deployment and operation of the Peacekeeper missile system. In addition, indirect impacts will result from population-induced pressures affecting existing residential and recreational patterns. Because the Air Force will develop and implement the mitigation measures described at the beginning of this section, the project will have no significant impact on prehistoric cultural resources. Consequently, detailed analyses are not included here. Nevertheless, a summary of the levels, scope (spatial extent), and timing of impacts for each project element is provided in Section 3.1.12.5.

#### 3.1.12.4.2 Historic Cultural Resources

##### 3.1.12.4.2.1 Baseline Future - No Action Alternative

Even in the absence of the Proposed Action, future loss of historic cultural resources will occur as a consequence of various natural and cultural factors. Although most of these anticipated changes will be detrimental to cultural values, certain actions also may be beneficial.

Long-term loss of humanistic and scientific values can be expected to occur throughout the Region of Influence and Area of Concentrated Study as a consequence of natural agencies such as erosion and decay, depending upon resource location (e.g., proximity to active erosion areas along watercourses) and current condition. Unattended and abandoned structures or sites will suffer greater degradation than those that are occupied or managed.

Long and short-term changes attributable to human agency are likely to be greater than those due to natural causes. Current rural and urban land use practices and anticipated future changes in regional demographics will exert a variety of effects on baseline conditions. For example, increasing regional population will be accompanied by greater use of existing recreational areas and a demand for additional facilities. Where such increased public access and use occurs and associated cultural sites are not under conscious management, the resource base will incur significant long-term losses.

Rural areas contain historic resources that reflect different cultural themes than those in urban areas. Structures tend to represent developmental trends in agricultural and ranching architecture or land use patterns. Most are situated on private lands that are subject to county ordinances and tend to lack the emotional appeal of urban structures. Funding for preservation programs is difficult to obtain, as is protection from vandals and collectors. The general decline in farming within the region has resulted and will continue to result in increased abandonment of farm houses and outbuildings that may have historic importance.

Known historic resources located within the region's cities and towns generally are standing structures. Although vulnerable to modification and/or destruction as a result of urban renewal programs, fire, vandalism, pollution, and urban blight, these resources also tend to have high visibility and often have been accorded some measure of protection through any of a variety of management programs ranging from tax incentives and block grants for restoration to municipal zoning variances. Several communities in the region (e.g., Cheyenne, Torrington, Greeley, Fort Collins) have taken active measures to identify and/or protect historic properties within their jurisdictions, and this trend is expected to gain further momentum in the future.

































The F.E. Warren Historic District/National Historic Landmark, encompassing approximately 200 individual historic structures, will continue to be used as a military installation and will be subject to potential modifications from new construction, adaptive reuse of existing structures, and ongoing maintenance. Such changes will have important short and long-term consequences for the Landmark's integrity.

#### 3.1.12.4.2.2 Proposed Action

Direct impacts will occur to historic cultural resources in the Area of Concentrated Study as a consequence of ground-disturbing activities and alterations to above-ground structures required as a part of system deployment and peacetime operations. In addition, indirect impacts affecting rural and urban historic properties in the Region of Influence will result from project-induced population immigration and associated changes in regional land use. Because the Air Force will develop and implement the mitigation measures identified earlier, the project will have no significant adverse impacts to most resources. Indeed, it is expected that implementation of these such mitigation measures will result in net beneficial effects to those onbase historic buildings that are scheduled to receive project modifications. At the same time, however, it is possible that the certain functional requirements entailed by placement of project activities in historic onbase facilities may not be able to be accommodated within the proposed mitigation framework. Because of the national importance of this resource, significant, moderate, short and long-term impacts are assigned to onbase facilities modification and construction.

#### 3.1.12.5 Summary of Impacts

Impacts to prehistoric and historic cultural resources are summarized in Figure 3.1.12-1, wherein the overall impacts of the Proposed Action are presented in matrix format. The criteria for determining level of impact and significance have been defined previously (Sections

LEGEND		ADVERSE IMPACTS	SIGNIFICANT ADVERSE IMPACTS	PROJECT IMPACTS					
LEVEL OF IMPACT*	LOW			SHORT TERM			LONG TERM		
	MODERATE			SITE	LOCAL	REGIONAL	SITE	LOCAL	REGIONAL
	HIGH								
POTENTIAL BENEFICIAL EFFECTS									
* MEASURE OF THE AMOUNT OF ENVIRONMENTAL CHANGE									
CULTURAL RESOURCES							 <sup>2</sup>		
PREHISTORIC AGGREGATE IMPACT							 <sup>2</sup>		
Facilities, Construction									
Fuel, Warren AFB							 <sup>2</sup>		
Launch Facilities									
Inter-Transporter Routes									
Defense Access Roads							 <sup>2</sup>		
Fuel, Warren AFB									
Alternative A1							 <sup>2</sup>		
Alternative A2							 <sup>2</sup>		
Alternative A3							 <sup>2</sup>		
Construction Dispatch Stations									
Preferred							 <sup>1</sup>		
Alternative							 <sup>1</sup>		
No Dispatch Stations									
viable Paths									
Preferred							 <sup>1</sup>		
Alternatives							 <sup>1</sup>		
Population/Land Use Change (Indirect)							 <sup>1</sup>		 <sup>1</sup>

<sup>1</sup> Impacts are those generated by construction activities and having a long duration.

<sup>2</sup> Impacts are those generated by construction activities and having a long duration as well as those generated only by operational activities.

FIGURE 3.1.12-1 PREHISTORIC AND HISTORIC CULTURAL RESOURCES SUMMARY IMPACT MATRIX



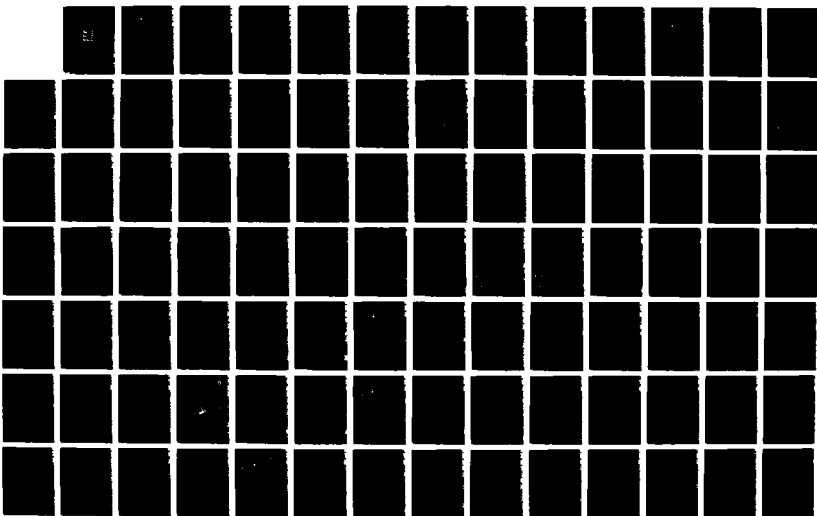
AD-A183 719

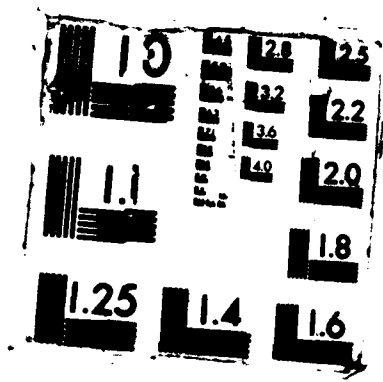
FINAL ENVIRONMENTAL IMPACT STATEMENT PEACEKEEPER IN  
MINUTEMAN SILOS FE WARREN AFB WYOMING VOLUME 1(U) AIR  
FORCE REGIONAL CIVIL ENGINEER-MX NORTON AFB CA JAN 84  
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UNCLASSIFIED

NL





LEGEND

LEVEL OF IMPACT \*

LOW

MODERATE

HIGH

ADVERSE IMPACTS

SIGNIFICANT ADVERSE IMPACTS

POTENTIAL BENEFICIAL EFFECTS

\* MEASURE OF THE AMOUNT OF ENVIRONMENTAL CHANGE

PROJECT IMPACTS

SHORT TERM

LONG TERM

SITE

LOCAL

REGIONAL

SITE

LOCAL

REGIONAL

HISTORIC AGGREGATE IMPACT						
Facility Construction						
F.E. Warren AFB						
Launch Facilities						
Stage Transporter Routes						
Defense Access Roads						
F.E. Warren AFB						
Alternative R1						
Alternative R2						
Alternative R3						
Construction Dispatch Stations						
Proposed						
Alternative						
No Dispatch Stations						
Cable Paths						
Preferred						
Alternatives						
Population/Land Use Change (Indirect)						

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Note: <sup>1</sup>Impacts are those generated by construction activities and having a long duration.

<sup>2</sup>Impacts are those generated by construction activities and having a long duration as well as those generated only by operational activities.

FIGURE 3.1.12-1 Continued

### PREHISTORIC AND HISTORIC CULTURAL RESOURCES SUMMARY IMPACT MATRIX

3.1.12.2 and 3.1.12.3) and have been applied to each of the proposed project actions and evaluated according to both geographic scope and timing. These detailed assessments form the basis for establishing aggregate impact ratings for the resource as a whole.

As noted previously, impacts to American Indian cultural resources and paleontological resources are not treated here because of the low likelihood of impacts. Such matrices are presented and discussed, however, in the Cultural and Environmental Resources Environmental Planning Technical Report.

#### 3.1.12.5.1 Explanation of Detailed Impact Matrix

##### 3.1.12.5.1.1 Prehistoric Cultural Resources

The rating for impacts to prehistoric cultural resources expected to occur as a consequence of the Proposed Action are shown in Figures 3.1.12-1 and 3.0-2. Separate consideration is given to the impacts of actions on the base and in the Deployment Area, which are treated within site-level ratings. Consequently, most impacts do not have a "local" effect. Local-level impact categorizations are reserved for effects occurring on a district-wide or municipality-wide basis.

Site-level, low, short and long-term impacts will result from onbase facilities construction and modification affecting prehistoric sites located in the immediate vicinity of proposed construction activities, and additional negligible impacts will occur in the long term due to project peacetime operations. Negligible impacts will occur as a consequence of modifications of existing Launch Facilities.

Moderate, short and long-term impacts will occur at the site level as a consequence of widening and upgrading Defense Access Roads because these activities will require new ground disturbance in areas expected to contain important prehistoric resources. Additional low, long-term impacts will occur as a consequence of increased access and altered local erosion characteristics affecting resources located immediately adjacent to road rights-of-way. The selection of either of the two resurfacing options for Defense Access Roads will, however, not change impact projections because such options will apply only to previously disturbed areas. Construction of onbase stage transporter routes, including the proposed Happy Jack Road realignment, will result in moderate to high, short and long-term impacts because proposed alignments intersect known important sites; additional low, long-term impacts will occur because of increased access and altered local erosion characteristics. While Alternative R2 has the greatest potential for both short and long-term impacts of the three major alternatives, selection of any of the design options that involve no new onbase road construction would reduce impact levels to negligible because choice of these options would not require any new ground disturbance affecting known prehistoric sites.

Low to negligible, short and long-term impacts will occur as a consequence of project dispatch station construction that could involve disturbance of prehistoric archaeological deposits. The "No Dispatch Station" option is preferable because each of the other proposed alternative involves increased use of F.E. Warren AFB or outlying communities and the consequent risk of direct or indirect impacts to prehistoric sites.

Moderate to high, short and long-term impacts will result from installation of buried cable paths. Although most cable path options have high anticipated levels of impact because they will traverse areas expected to contain abundant important prehistoric cultural materials, the Proposed Action will have less overall impact because paths PA1 and RB1 traverse areas expected to contain fewer such sites.

Low, short and long-term impacts will be generated regionally by population-induced and recreation-oriented activities involving increased artifact predation and subsurface disturbance (e.g., construction of new housing).

#### 3.1.12.5.1.2 Historic Cultural Resources

The ratings for impacts to historic cultural resources expected to occur as a consequence of the Proposed Action are shown in Figure 3.1.12-1 and 3.0-2.

Significant, moderate, short and long-term impacts at the site level are expected to result from onbase facility construction and modification, particularly as they affect buildings within the Historic District/National Landmark; additional significant, low, long-term impacts will occur as a consequence of project operations. At the same time, however, implementation of the types of specific mitigation measures discussed in Section 3.1.12.4 will result in a substantial net beneficial effect to historic architectural resources affected by the project, and adaptive reuse of facilities for project functions should also help to prolong the useful life of these structures. Certain functional requirements of project facilities may not be accommodated within onbase historic buildings without loss of resource integrity. Consequently, impacts to onbase facilities are rated as significant in both the short and long term.

Widening and upgrading of Defense Access Roads will have low, short and long-term impacts due to the possibility of intersecting important historic archaeological deposits; additional low, long-term impacts will result from increased access and altered local erosional characteristics. Selection of either of the two road resurfacing options will not affect these impact ratings. Construction of onbase stage transporter routes, including the proposed Happy Jack Road realignment, will result in moderate to high, short and long-term impacts because proposed alignments intersect several important historic archaeological sites; additional low, long-term impacts will occur because of increased access and altered local erosional characteristics. Alternative R2 has the greatest potential for both short and long-term impacts of the three major alternatives; however, selection of any of the design options that involve no new onbase road construction would reduce impact levels to negligible because they would not necessitate new ground disturbance that could affect important historic archaeological resources.

Negligible to low, short and long-term adverse impacts will result from use of construction dispatch stations. The "No Dispatch Station" option is preferable because each of the other proposed alternatives involves increased use of F.E. Warren AFB or outlying communities and the consequent risk of direct or indirect impacts to historic structures and/or archaeological sites.

Activities associated with the installation of buried cables in the Deployment Area will result in moderate, short and long-term impacts because of the likelihood of path alignments intersecting important historic archaeological and architectural properties. Although most options have high anticipated levels of impact, the Proposed Action will have less overall impact because paths PA1 and RB1 have a lower chance of intersecting important historic cultural resources.

Low, short and long-term impacts will be generated regionally by population-induced and recreation-oriented activities involving increased artifact predation, subsurface disturbance of historic archaeological deposits (e.g., construction of new housing), and alteration or demolition of historic architectural structures.

### 3.1.12.5.2 Aggregation of Elements, Impacts, and Significance

Aggregate impacts to cultural resources are expected to be moderate and significant in the short and long term at the site level, and negligible otherwise (Figure 3.0-1); net beneficial effects may accrue from the implementation of assumed mitigation measures.

The aggregation of levels of impact and significance ratings from individual resource elements to the resource itself is accomplished by a two-step process. The following paragraphs explain the methods used in developing aggregate impact ratings as well as the results of applying such aggregation methods in the current assessment effort.

The first step involves combining impact ratings assigned to individual aspects of the Proposed Action (e.g., facilities construction at F.E. Warren AFB) to arrive at aggregate ratings for a resource element as a whole. Specification of element-level aggregate ratings involves assigning a summary measure that best reflects the overall level of impact for the Proposed Action. This attribution is based on both professional experience and a judgmental qualitative weighting of level of impact ratings for the several individual components of the Proposed Action; the various aspects of the project will have quite different kinds of impacts on any resources that may be subject to direct or indirect impact. For example, laying of proposed cable paths will result in intense, narrow, linear ground disturbances that will alter but probably not wholly destroy most resource sites intersected by an alignment. On the other hand, proposed facilities construction will affect broader areas, which could include entire sites. Consequently, the level of impact ratings for facilities construction carries more weight than those for cable paths. Insofar as the current analysis is concerned, both prehistoric and historic cultural resources have the same element-level aggregate ratings (Figure 3.1.12-1): 1) moderate in the short term at the site-level, 2) moderate in the long term at the site-level, and 3) negligible otherwise. However, aggregate impacts to historic cultural resources are rated as significant because on-base facilities modifications could result in loss of important historic architectural values within the Historic District/National Landmark.

Once summary ratings have been established for a resource element, the second step in the process involves assigning aggregate level of impact ratings to the resource as a whole. Given that no basis exists for differential weighting of prehistoric and historic cultural resource elements, aggregate impact determinations make use of equal-weighted averaging of the individual element level ratings. For example, if high, short-term, site-level impacts are specified for prehistoric cultural resources and low impacts are specified for the historic cultural resource element, the overall short-term, site-level impacts to cultural resources will be rated moderate. In the current analysis, the element-level aggregate ratings for both prehistoric and historic cultural resources were identical (Figure 3.1.12-1), and, consequently, resource-level ratings were the same as the element-level ratings. Aggregate impacts are rated as significant because of the importance of potential losses of historic properties within the Historic District/National Landmark; net beneficial effects also are assigned to the aggregate resource level because of the importance of the Historic District/National Landmark.

### 3.1.12.6 Mitigation Measures

In addition to the specific mitigation measures the Air Force will develop and implement as part of the Proposed Action (see Section 3.1.12.4.2), several general mitigation measures will be considered to treat potential indirect project impacts on lands outside Air Force jurisdiction and control (i.e., the Region of Influence).

The identification and mitigation of project-caused indirect impacts in the Region of Influence will require the cooperative involvement of external federal, state, and local agencies having jurisdiction over such resources during both system deployment and operation. These agencies are encouraged to:

- o Strengthen or augment existing sanctions against inappropriate or destructive use of these resources; and
- o Offer inducements to protect and enhance significant cultural and paleontological properties held in private or public hands.

Although in some instances implementation of these measures could require drafting and enactment of new legislation at the state or local level, to a large degree mitigation of adverse impacts from indirect project-induced causes can be accomplished within the existing statutory framework and would result in an overall lowering of impact levels in the Region of Influence.

#### **3.1.12.7 Unavoidable Adverse Impacts**

Despite the best application of mitigation measures outlined in the preceding sections, unavoidable losses of important scientific or humanistic qualities may result from the Proposed Action. These include:

- o Indirect impacts (e.g., vandalism, collection, fire, off-road vehicle damage) in the Region of Influence from increased immigration population levels during the construction and operational phases;
- o Indirect impacts from increased onbase personnel required for operation of the Peacekeeper missile; and
- o Direct impacts from construction-related disturbance of the existing land surface affecting resources that have escaped detection during inventory.

It should be stressed, however, that impacts of these kinds can be expected as a consequence of implementing any action involving disturbance of existing land surfaces in areas that contain cultural or paleontological resources.

Because of the large area included within the Region of Influence and the relatively small numbers of projected immigrants, unavoidable loss of scientific and humanistic values from indirect effects is not expected to be great, even on a cumulative basis. The same holds true for the unavoidable direct impacts of construction operations. Implementation of an effective resources monitoring program during project construction will reduce the chances of encountering and disturbing potentially important cultural and paleontological resources. In cases where such resources are encountered and avoidance is not feasible or practical, emergency data recovery efforts will be implemented in order to minimize adverse impacts.

#### **3.1.12.8 Irreversible and Irretrievable Resource Commitments**

Cultural and paleontological resources are fragile and nonrenewable, and disturbance of any kind will result in loss of data and/or material content that is irreversible and irretrievable. For example, archaeological sites that escape detection during the inventory phase may be lost, in whole or in part, despite the best emergency data recovery efforts.

At the same time, even in those instances where mitigation measures are implemented prior to construction activities, some degree of irreversible and irretrievable resource loss must be anticipated since recovery and recording techniques cannot hope to document resources in their entirety. For example, some kinds of information may not even be recognized as being artifactual in nature, and no specific mitigation measures can absolutely guarantee that important data will not be lost. Nevertheless, it is anticipated that such circumstances will have minimal adverse impacts to the existing resource base.

**3.1.12.9     The Relationship Between Local Short-Term Use of Man's Environment and Maintenance and Enhancement of Long-Term Productivity**

Baseline-future conditions will result in the cumulative degradation of non-renewable cultural and paleontological resources, but the process and resultant loss will be accelerated on a short and long-term basis by trenching, construction, and other ground-disturbing activities associated with the project in the Area of Concentrated Study. Other resources, however, including some that otherwise might have been disturbed or destroyed by nonproject-related human or natural agencies, may benefit from the Proposed Action because they will be stabilized, protected, preserved, and maintained. This is particularly true of historic buildings at F.E. Warren AFB affected by the project. Even where some loss of resources is predicted (e.g., along onbase stage transporter routes or buried cable paths), specific mitigation measures will obtain and preserve information and cultural materials that will contribute substantially to knowledge of regional culture history. It is anticipated that the number of cultural and paleontological resources lost without benefit of some form of mitigation will be small, and the resulting loss of long-term productivity in the Region of Influence will be slight.



### **3.1.13      Visual Resources**

#### **3.1.13.1    Introduction**

This section describes the impacts of the Proposed Action on visual resources. It includes a description of the criteria used to classify impacts and determine their significance.

The Area of Concentrated Study is the six-county region because direct impacts will be concentrated at F.E. Warren AFB and the Deployment Area. Indirect population-induced impacts are projected in those cities and towns where the majority of immigrants are expected to settle. The information in this section is based upon data and detailed analysis contained in the Land Use Environmental Planning Technical Report.

#### **3.1.13.2    Definitions of Levels of Impact**

The methodology used to determine the magnitude of impacts is based on the Bureau of Land Management (BLM) Contrast Rating System. Landscape elements are segmented and rated, assigned a weight according to the BLM system, and combined and averaged to obtain a total feature rating. This results in the following levels of impact.

- o Negligible Impact - Assigned to a feature in which three of the four elements have no degree of contrast (0-4 points).
- o Low Impact - Assigned to a feature whose four elements have a weak degree of contrast (5-10 points).
- o Moderate Impact - Assigned to a feature whose four elements have a medium degree of contrast (11-20 points).
- o High Impact - Assigned to a feature in which at least one element has an overall strong degree of contrast and whose total point range is greater than 21, exceeding BLM objectives for total contrast ratings (21-30 points).

#### **3.1.13.3    Determination of Significance Criteria**

Landscape features which have a high visual impact (i.e., features which depict a strong degree of contrast and exceed BLM contrast rating objectives by greater than 21 points) are significant because of the spatial extent to which they are noticeable.

#### **3.1.13.4    Assumptions, Assumed Mitigations, and Environmental Impacts of the Proposed Action and Project Alternatives**

**Assumptions.** The method for predicting impacts of the proposed project on visual resources measured the degree of visual contrast between proposed project activities and the existing landscape. A modified version of the BLM Contrast Rating System was used; it reveals the elements and features that will cause the highest visual impact.

Contrasts were measured by separating and examining the major features of the landscape (land/water surface, vegetation, and structures) and predicting the change in each of the basic elements (form, line, color, and texture) within the landscape feature.

Contrast in the basic elements of the landscape is measured on a weighted scale ranging from 4 (form) to 1 (texture). An indication of the strength of contrast is determined by assigning a different weight to the degree of contrast (3 for strong, 0 for none) and multiplying it by the weight of each element. When these are totaled, the visual impact for each landscape feature is attained. This process is repeated for each feature separately.

Assumed Mitigations. The following are assumed mitigations:

- o For temporary disturbances, reestablishment of landform to original character where possible (Air Force);
- o Placement of plant material to screen or blend proposed buildings with the landscape (Air Force);
- o Revegetation with appropriate plant species (Air Force);
- o Implementation of erosion and dust control measures (Air Force); and
- o Design of new base facilities to conform to existing architecture, and painting to blend with landscape (Air Force).

Environmental Impacts. Environmental impacts of the Proposed Action and project alternatives are discussed in the following subsections.

#### 3.1.13.4.1 Baseline Future - No Action Alternative

To analyze future trends, known projects or major proposed activities were considered with respect to landscape modification or the introduction of visual intrusions that could alter existing conditions or impact visual resources. None were found to be applicable.

#### 3.1.13.4.2 Proposed Action

Direct and indirect impacts on visual resources will occur with implementation of the Proposed Action. Project activities will alter the surface, vegetative, and structural characteristics of the landscape over the short-term construction phase. Long-term impacts for all aspects of the Proposed Action will be negligible (0-4 points) and not significant after regrading and revegetation are completed.

##### 3.1.13.4.2.1 Operating Base Facility Development

Construction activities at the Operating Base will create a moderate visual impact during the short-term construction phase (averaged contrast rating score of 12.6 points, i.e., not significant). Short-term impacts will result from clearing vegetation for building sites, clearing for road systems and railway development, and earth movement associated with construction of the various support and deployment facilities. Impacts will be limited to the viewshed or that segment of the landscape that is seen from the travel route adjacent to the proposed facilities.

##### 3.1.13.4.2.2 Cable System

Cable installation will create a negligible impact during the short-term construction phase (averaged contrast rating score of 4.6 points, i.e., not significant). All 11 siting alternatives will create the same negligible impact; therefore, no worst-case example has been cited. Short-term impacts will include clearing and stripping of vegetation followed by soil excavation and stockpiling while cable installation occurs.

#### 3.1.13.4.2.3 Transportation Network

The missile will be transported between the Operating Base at F.E. Warren AFB and silos in the Deployment Area on the existing road network wherever possible. Construction activity to upgrade the road system will create a low visual impact for the immediate area adjacent to the affected roadways (averaged contrast rating score of 6, i.e., not significant). Short-term impacts will include vegetative clearing and regrading.

In addition to upgrading the Defense Access Road system, construction activities will be needed to connect F.E. Warren AFB with Interstate 80. All of three design options will have a low (averaged contrast rating score of 8.6 points, i.e., not significant) and temporary visual impact.

#### 3.1.13.4.2.4 Dispatch Stations

Two areas are proposed as dispatch station options for the contractor, one each in the eastern and northern portions of the Deployment Area. Although specific locations have not yet been identified, the EIS analyzed locations in the vicinities of Chugwater, Wyoming and Kimball, Nebraska since they are representative of the communities that might be selected. The dispatch stations would consist of a site with 1 or more portable buildings, an open area for equipment and materials storage, and parking for up to 100 construction-related vehicles.

Short-term impacts could include vehicular exhaust, dust from excavation and other construction-related airborne matter which may reduce visibility, and possible clearing of vegetation. Short-term visual impacts will be negligible (averaged contrast rating score of 4.3, i.e., not significant).

### 3.1.13.5 Summary of Impacts

#### 3.1.13.5.1 Explanation of Detailed Impact Matrix








To summarize impacts of the Proposed Action on visual resources (Figure 3.1.13-1), results of the BLM Contrast Rating system were combined and averaged. The contrast rating scores for Operating Base construction (moderate 12.6 points), Defense Access Road network (low 6 points), base access roads (low 8.6 points), cable routes (negligible 4.6 points), and dispatch stations (negligible 4.3 points) produce an overall low visual impact (7.2 points) for site-specific, short-term activities. Local and regional short-term impacts, and site-specific, local, and regional long-term impacts are negligible and not significant.

#### 3.1.13.5.2 Aggregation of Elements, Impacts, and Significance

Since visual resources contains one element, no aggregation was performed.

#### 3.1.13.5.3 Alternatives Within the Proposed Action

The impacts of various development options within the Proposed Action on visual resources are summarized in the overall matrix (Figure 3.0-2). All the options for siting the cables and the dispatch stations would create a negligible visual impact. All three of the alternatives for road construction would create a low visual impact. All impacts are temporary in nature and not significant.

LEGEND		ADVERSE IMPACTS	SIGNIFICANT ADVERSE IMPACTS
LEVEL OF IMPACT*	LOW		
	MODERATE		
	HIGH		
POTENTIAL BENEFICIAL EFFECTS			
* MEASURE OF THE AMOUNT OF ENVIRONMENTAL CHANGE			

[illegible]

**FIGURE 3.1.13-1 VISUAL RESOURCES IMPACT MATRIX**

**3.1.13.6     Mitigation Measures**

No mitigation measures are recommended beyond the assumed mitigations discussed in Section 3.1.13.4.

**3.1.13.7     Unavoidable Adverse Impacts**

There are no unavoidable adverse impacts on visual resources.

**3.1.13.8     Irreversible and Irretrievable Resource Commitments**

There are no irreversible and irretrievable commitments of visual resources.

**3.1.13.9     The Relationship Between Local Short-Term Use of Man's Environment and Maintenance and Enhancement of Long-Term Productivity**

Impacts on visual resources will be short term and temporary, occurring only during certain construction activities. Long-term productivity of the environment as it relates to visual resources will not be affected.

## **3.2      Natural Resources**

### **3.2.1    Water Resources**

#### **3.2.1.1   Introduction**

Water will be required for project construction, operation, and to satisfy demands induced in the Region of Influence by immigrating workers, dependents, and related induced activities. Construction of facilities may alter natural drainageways and impact storm runoff with resulting erosion and sedimentation. Increased water use will result in increased wastewater flow which can impact the natural water resource system as it returns to the environment.

The analysis focuses on the Crow Creek watershed Area of Concentrated Study since direct and indirect project water use and demand are expected to be great only in this Area of Concentrated Study, and the effects of meeting the demand and of project-induced construction could affect other water resource elements. In the other Area of Concentrated Study watershed areas, analysis centers on direct effects of project construction since impacts will be restricted to the watersheds. Indirect or induced water demands for municipalities outside the Crow Creek watershed are also considered.

The information in this section is based upon data and detailed analysis contained in the Water Resources Environmental Planning Technical Report.

#### **3.2.1.2    Definition of Levels of Impact**

Level of impact definitions for water resources and for each water resource element used in the analyses are shown in Table 3.2.1-1 and further described below.

##### **3.2.1.2.1      Water Demand and Water Use**

The project will require water for its construction. It will also cause an induced water demand due to immigrating population drawn to the area because of the project or related construction.

The increase in amount of water used, capacity of existing systems, and present cost of service are relatively easy to measure attributes of this water resource element. Level of impact is determined by changes to the existing system that will be needed to match water supply and water demand.

##### **3.2.1.2.2      Constraints on Water Use**

The cost of, or difficulty in, meeting constraints relative to the acquisition and development of water resources or their protection will depend upon the area in which the project is located. Changes in requirements and constraints are difficult to quantify, requiring more qualitative evaluations. Some general criteria for assessing the level of impact the project will have on existing individual water rights can be formulated (where right to use water is controlled).

Project-induced changes in the water resource system may require construction of new facilities or changes in operation of existing ones to comply with laws adopted to protect or manage the water resource system.

Table 3.2.1-1

## DEFINITION OF LEVEL OF IMPACT FOR WATER RESOURCES

Resource Element	Negligible	Low	Moderate	High
Water Resources	Will result in no easily measurable change in the projected baseline water resource system.	Will result in a measurable change in the projected baseline water resource system that could require minor modification in operations.	Will result in a measurable change in the projected baseline water resource system that will require minor modification in operations or facilities.	Will result in a measurable change in the projected baseline water resource system that will require major changes in operations or facilities.
Water Demand and Water Use	Will permit the increase in the amount of water required to meet project direct and induced demands to remain within the projected baseline capacity of existing delivery systems and will require no change in system operation. No cost impacts on existing users will occur.	Will permit the increase in the amount of water required to meet project direct and induced demands to remain within the projected baseline capacity of existing delivery systems but will require minor increases in system operation to satisfy demands. No cost increases will be required to deliver the required amounts of water to existing water users.	Will increase the amount of water needed to meet project direct and induced demands so as to exceed the projected baseline available capacity of existing delivery systems. Capacity could be increased by construction of minor new facilities or by increases in system operation. The cost of the facilities to deliver the required amount of water could require a minor cost change for existing water users.	Will increase the amount of water required to meet project direct and induced demands so as to exceed the projected baseline available capacity of existing delivery systems. Capacity could be increased by construction of major new facilities or major increases in system operation. Major water cost changes will result for existing users.
Constraints on Water Use	Will require no acquisition of existing water rights.	Will require some acquisition of projected baseline existing water rights. Water rights will be relatively easy to acquire, and acquisition will not affect the livelihoods of the former owners.	Will require acquisition of many projected baseline existing water rights. Water rights will be difficult to acquire and will affect the livelihoods of the previous owners. Minor facilities may be needed in order to transport the water where it is needed.	Will require more extensive acquisitions of projected baseline existing water rights than could be acquired in the area and major physical facilities will be needed to import water.

Table 3.2.1-1 Continued, page 2 of 2  
DEFINITION OF LEVEL OF IMPACT FOR WATER RESOURCES

Resource Element	Negligible	Low	Moderate	High
Surface Water Hydrology and Quality	Will result in no easily measurable projected baseline changes in water erosion, sedimentation potential, or associated water quality degradation, flood flows, wastewater discharge to streams, or changed surface water flow (whether increase or decrease).	Will result in small but measurable projected baseline changes in water erosion, sedimentation potential, and associated water quality degradation, flood flows, wastewater discharge to streams, or surface water flow that will require slight modifications in operations.	Will result in measurable projected baseline changes in water erosion, sedimentation potential, and associated water quality degradation, flood flows, wastewater discharge to streams, or surface water flow that will require modifications in operations or construction of minor new facilities.	Will result in measurable projected baseline changes in water erosion, sedimentation potential, and associated water quality degradation, flood flows, wastewater discharge to streams, or surface water flow that will require major changes in operations or construction of major new facilities.
Groundwater Hydrology and Quality	Will result in no easily measurable projected baseline reductions in existing wells or spring flow, and no easily measurable degradation of groundwater quality from increased wastewater discharges.	Will result in small but measurable projected baseline reductions in existing wells or spring flow, or a small but measurable degradation of groundwater quality from increased wastewater discharges that will require slight modifications in operations.	Will result in measurable projected baseline reductions in water levels in existing wells or in spring flow, or a measurable degradation of groundwater quality from increased wastewater discharges that will require modifications in operations or construction of minor new facilities.	Will result in measurable projected baseline reductions in water levels in existing wells or in spring flow, or a substantial measurable degradation of groundwater quality from increased wastewater discharges that will require construction of major new facilities.



#### 3.2.1.2.3 Surface Water Hydrology and Quality

The project could exert a number of possible impacts on surface water hydrology and quality, including an increase in the erosion potential and associated water quality degradation, an increase in flood flows, an increase in wastewater discharge to streams, or an increase or decrease in surface water flow. Because of these varied possible impacts, defining the level of impact requires multiple criteria. The level of impact assigned is the highest category for which any of these defined criteria are satisfied.

The change in each attribute of surface water hydrology and quality can be calculated using various analytical techniques to assign level of impact.

#### 3.2.1.2.4 Groundwater Hydrology and Quality

As with surface water hydrology and quality, there are several possible effects that the project could have on the groundwater hydrology and quality. These include reductions in water levels in existing wells or in spring flow, and degradation of groundwater quality from increased wastewater discharges. Geologically related impacts, such as subsidence, that could be due to groundwater withdrawal are addressed in the geologic resources section. Once again, the level of impact assigned will be the highest category for which any of the criteria are satisfied.

As in surface water hydrology and quality the changes in each attribute of groundwater hydrology and quality can be calculated using various analytical techniques to assign level of impact.

#### 3.2.1.3 Determination of Significance Criteria

For water resources, an impact is significant if:

- o It will violate laws or regulations adopted to protect or manage the water resource system;
- o It will endanger public health or safety by creating or worsening an adverse safety condition or a health hazard;
- o It will reduce water availability to, or interfere with existing users creating a situation the user is unable to respond to;
- o It will threaten or damage unique hydrologic characteristics of the area; or
- o It will change preproject hydrologic baseline conditions over an extensive area or period of time, so that resultant conditions are highly controversial, highly uncertain, or involve unique or unknown risks.

The determination of significance of impacts is applied on site-specific, local, and regional levels. For the purposes of the water resource assessment, site specific is the location where direct construction activities are occurring and includes F.E. Warren AFB in the Crow Creek watershed, and areas within 1,000 feet of Launch Facilities, Launch Control Facilities, cables, potential project wells, or Defense Access Roads. Local is the city jurisdiction or district surrounding an impacted area and includes the Cheyenne Urban Area in the Crow Creek watershed, and an area within 2 miles of Launch Facilities, Launch Control Facilities, cables, potential project wells, or Defense Access Roads. Regional includes the entire watershed area in the Region of Influence. If the anticipated water resource impacts do not meet any of these criteria for the defined area, then they will be considered not significant for that area.

### **3.2.1.4     Assumptions, Assumed Mitigations, and Environmental Impacts of the Proposed Action and Project Alternatives**

**This section assesses effects on water resources from the Proposed Action and project alternatives. The level of impact resulting from these effects is estimated, as is the potential significance of those impacts using the above procedures.**

**Assumptions.** Procedures used to forecast future conditions with and without the project were as follows. For water use and demand, use rates were assumed to remain as determined in the existing conditions plus an allowance for industrial growth in Cheyenne. This is 180 gallons per capita per day (gpcd) plus existing industrial use plus 100 acre-feet per year (acre-ft/yr) industrial growth in Cheyenne and 250 gpcd for other areas. These per capita values are assumed for induced population. Project construction water requirements are developed separately.

Legal requirements and constraints are assumed to remain as they now are. All project activities will be consistent with applicable existing state and federal water law.

Procedures used to describe existing conditions for storm runoff and drainage, erosion potential, and wastewater discharges are repeated for the population and land use changes that will occur with or without the project. The disturbed area subject to erosion for analysis purposes was assumed as 0.5 acre per Launch Facility, about 3.3 acres per mile of road, about 2.4 acres per mile of cable, and about 130 acres at F.E. Warren AFB. For groundwater hydrology and quality it was assumed that construction wells, if any, will have maximum capacities of 100 gallons per minute (gpm). Single well hydraulic equations (U.S. Bureau of Reclamation 1977) were applied to typical aquifer characteristics to forecast likely drawdown. More sophisticated modeling is being done in the Crow Creek watershed (Ertec 1983). Additional specific assumptions and analysis procedures are discussed under individual water resource elements.

**Assumed Mitigations.** Methods of mitigation of potentially significant impacts are also presented. Certain mitigations are part of standard Air Force construction practices or policy. For potential water resource impacts these include:

- o Compensation to current water users who may be directly impacted during project construction in compliance with state and federal water laws;
- o Minimization of site disturbance and employment of proper revegetation techniques to reduce erosion potential;
- o Construction of stormwater detention and erosion control facilities to control increased surface runoff impacts; and
- o Development of water supply and waste disposal facilities as may be required for project facilities.

The implementation of these standard mitigation measures was assumed in evaluating the level and significance of impacts on the water resource system.

**Environmental Impacts.** Environmental impacts of the Proposed Action and project alternatives are discussed in the following subsections.

#### **3.2.1.4.1      Water Demand and Water Use**

Projection of water demand through the year 1991 will encompass the time period required for project construction and stabilization of the population to operational levels.

##### **3.2.1.4.1.1      Baseline Future - No Action Alternative**

**Crow Creek Watershed.** The Cheyenne Urban Area is the only area in the Crow Creek watershed where the Proposed Action will induce a measurable change. Table 3.2.1-2 shows a year-by-year projection of water demand and water supply for the Cheyenne Board of Public Utilities service area through the year 1991. Values for supply represent the net amount of water that is delivered through the raw water delivery system in the Crow Creek watershed and thus exclude evaporation and spillage losses. Water supply is being reduced temporarily by Stage II construction, and the Cheyenne Board of Public Utilities plans to use wells at higher rates than desired and withdraw water from storage in reservoirs to meet near-term demands. Other water demands in the watershed are projected to increase water use in the watershed to 37,100 acre-ft/yr by 1991.

**Other Areas.** Water use in the 6-county area described in Section 2.2.1.2.1.2 is expected to increase to 839,000 acre-ft/yr in 1990 with most of the increase due to increased agricultural irrigation. Baseline projections for potentially impacted communities in 1990 indicate a demand of 550 acre-feet (acre-ft) for Pine Bluffs, 2,340 acre-ft for Wheatland, 5,170 acre-ft for Torrington, 57 acre-ft for Chugwater, 73 acre-ft for Albin, 1,020 acre-ft for Kimball, 4,650 acre-ft for Scottsbluff, and 3,860 acre-ft for Gering.

##### **3.2.1.4.1.2      Proposed Action**

Impacts are evaluated for construction water requirements and for project-induced population demands. The project water requirements of the Proposed Action for these purposes is shown in Table 3.2.1-3. None of the project alternatives will change the induced demand values. Water requirements for the F.E. Warren AFB road alternatives are all about 8 acre-ft. Revegetation water requirements for the Proposed Action cable routes are 50 acre-ft. Project cable route alternatives range from 32 to 68 acre-ft.

**Crow Creek Watershed.** It is assumed that construction water demands at F.E. Warren AFB and induced water demands will be supplied by the Cheyenne Board of Public Utilities. The impact of construction water demands in Cheyenne is negligible since little or no project construction will occur there. The impact of the project on the Cheyenne Urban Area is shown in Figure 3.2.1-1. The ability of Cheyenne's water system to supply the water necessary to satisfy the demands is somewhat limited in the initial project years. In 1984 the project plus baseline will result in a water shortage of 4,040 acre-ft, rather than a shortage of 3,970 acre-ft, as projected under baseline only conditions. After 1984, the effect of the project is to reduce the amount of surplus water available for increasing storage in Crow Creek reservoirs. The long-term operating demand will create a water shortage 1 year earlier with the project than without it. Several alternatives (i.e., increased pumpage of wells, modifications to raw water delivery system, wastewater reuse at F.E. Warren AFB, purchase of existing water rights) are being examined to increase water supply or reduce water demand for the Cheyenne Urban Area in water supply planning for the project (Ertec 1983). The induced water demands will result in a short-term, moderate, significant impact for the Cheyenne Urban Area since minor new facilities may be required and reduction in water availability to existing users could occur. Short and long-term impacts are rated low and not significant for F.E. Warren AFB since

Table 3.2.1-2

## CHEYENNE BASELINE MUNICIPAL WATER DEMANDS

	1983	1984	1985	1986	1987	1988	1989	1990	1991
<u>Water Demand (acre-ft)</u>									
Industrial	2,500	2,600	2,700	2,800	2,900	3,000	3,100	3,200	3,300
Nonindustrial	11,890	12,010	12,270	12,490	12,740	12,990	13,260	13,520	13,800
TOTAL:	14,390	14,610	14,970	15,290	15,640	15,990	16,360	16,720	17,100
<u>Water Supply (acre-ft)</u>									
Net Import from <sup>1</sup> Douglas Creek	1,510	4,120	8,850	10,430	10,430	10,430	10,430	10,430	10,430
Crow Creek Watershed <sup>2</sup>	4,150	4,520	4,790	4,840	4,840	4,840	4,840	4,840	4,840
Municipal Wells <sup>3</sup>	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000
TOTAL:	7,660	10,640	15,640	17,270	17,270	17,270	17,270	17,270	17,270
Supply-Demand	-6,730	-3,970	670	1,980	1,630	1,280	910	550	170

<sup>1</sup> Net import downstream of reservoirs. Net inflow to reservoirs is 2,100 acre-ft in 1983, 5,080 acre-ft in 1984, 10,080 acre-ft in 1985, and 11,710 acre-ft in later years. Water diversion from Douglas Creek will be 2,400 acre-ft in 1983, 5,500 acre-ft in 1984; 10,700 acre-ft in 1985; and up to 12,400 acre-ft in 1986 and later years.

<sup>2</sup> Crow Creek watershed supply equals 1,220 acre-ft/yr from North Crow and inflow to the Middle Crow reservoirs, less a share of existing evaporation and spillage losses which are apportioned based on the percent of total flow to the reservoirs from import water and watershed inflow. A 1 in 10-year drought would reduce the supply by approximately 900 acre-ft. The overall result of this in any particular year can be seen by subtracting 900 acre-ft from the supply-demand values.

<sup>3</sup> Assumes total pumpage is reduced to 2,500 acre-ft/yr, and irrigation use remains at 500 acre-ft/yr.

Table 3.2.1-3  
PROJECT WATER REQUIREMENTS

	1984	1985	1986	1987	1988	1989	1990	TOTAL
<b>Construction Water Demands<sup>1</sup> (acre-ft)</b>								
F.E. Warren AFB	13	49	5	-	-	-	-	67
Deployment Area	8	160	179	94	8	-	-	449
Nebraska Section	-	-	56	88	5	-	-	149
Wyoming Section	8	160	123	6	3	-	-	300
TOTAL:	21	209	184	94	8	-	-	516
<b>Induced Water Demands<sup>2</sup> (acre-ft)</b>								
Cheyenne	53	258	516	571	531	512	291	2,732
Deployment Area	-	55	167	160	156	148	-	686
Nebraska Section	-	1	27	34	114	148	-	324
Wyoming Section	-	54	140	126	42	-	-	362
TOTAL:	53	313	683	731	687	660	291	3,418

<sup>1</sup> Includes 100 percent for contingencies.

<sup>2</sup> A continuing operating demand in Cheyenne of 250 acre-ft/yr is expected in 1991 and later years. The Launch Control Facilities will continue to use 12 acre-ft/yr in the Deployment Area. Values include increased operational demand at F.E. Warren AFB of 7 acre-ft in 1985 and 63 acre-ft in 1986 and later years.

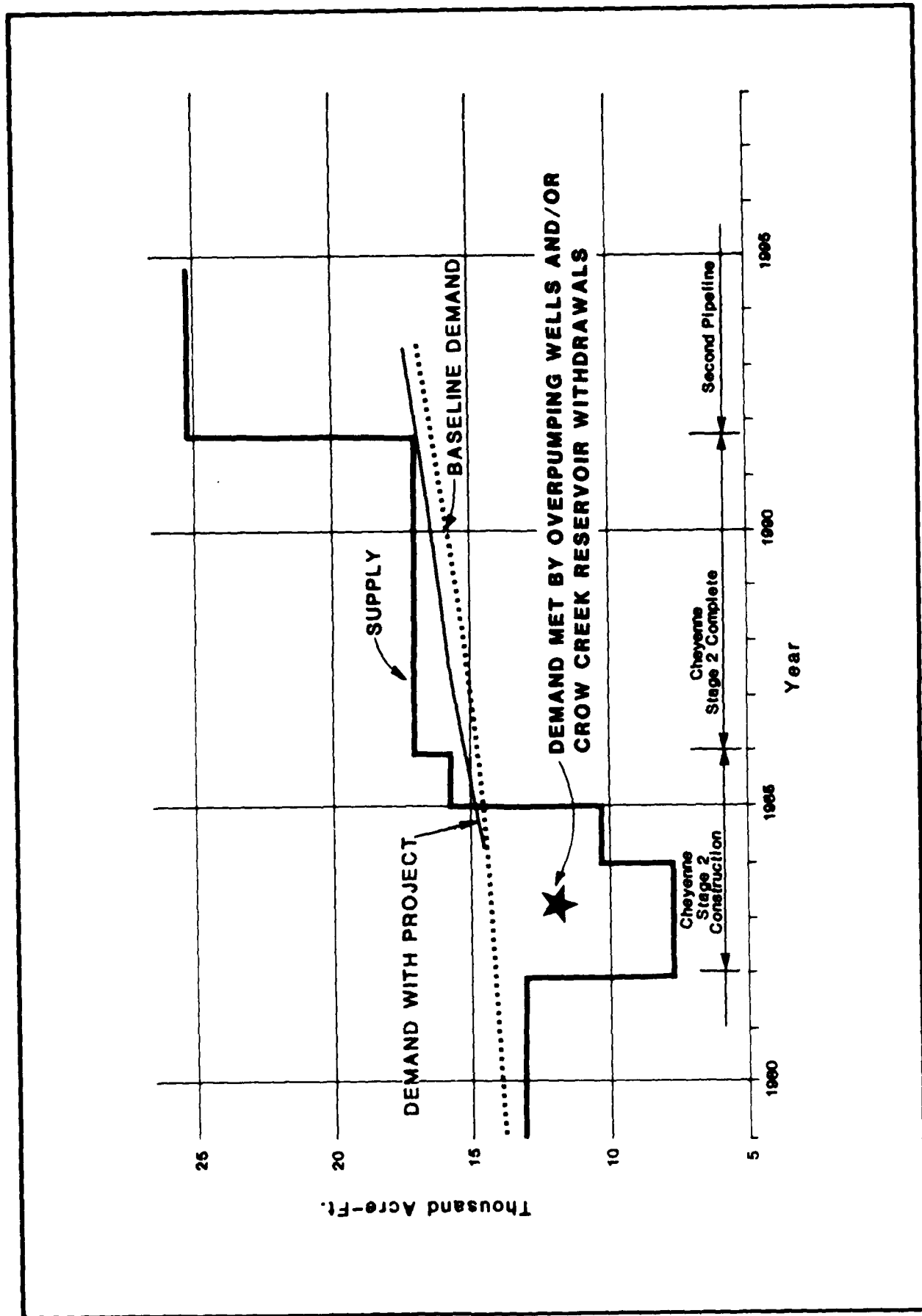


FIGURE 3.2.1-1 PROJECT IMPACT ON CHEYENNE URBAN WATER SUPPLY

demands will only require increased operation of facilities and will not interfere with existing users. Negligible impacts will occur in the Crow Creek watershed in the short and long term. Low, long-term, not significant impacts will occur in the Cheyenne Urban Area due to the 1-year earlier required development of a new water supply.

Other Areas. Water supply for construction and induced demand in the Deployment Area are assumed to come from wells. Construction water is to be supplied by development of new groundwater supplies or purchase or temporary use of existing water rights following procedures of the states. Because of the short-term limited use, no long-term effects are anticipated. Existing water supplies in all potentially impacted communities are adequate to meet increased demands of the induced population, but increased operations may cause a low, not significant, short-term impact. Water development may require construction of minor new facilities so impacts are rated moderate for the site and local levels, but since facilities would not interfere with existing users the impacts are not significant.

#### 3.2.1.4.2 Constraints on Water Use

##### 3.2.1.4.2.1 Baseline Future - No Action Alternative

No change in controls on water use or water quality protection are forecast. Additional water rights may be required to meet forecast demands and increased use could impact existing water rights.

##### 3.2.1.4.2.2 Proposed Action

No change in controls on water use or water quality protection are forecast as a result of the Proposed Action or project alternatives so negligible, not significant impacts are expected.

Crow Creek Watershed. No water rights will be needed at F.E. Warren AFB. The most likely method of meeting increased demand from induced population is through increased use of the existing supply (both surface water and water from the municipal well fields) which would have a negligible impact on existing water rights. The most reasonable alternative to this action would be to supplement the existing supply by lease or purchase of existing water rights in the Crow Creek watershed. This alternative would cause a low, not significant impact in the short term.

Other Areas. Development of water for project construction could impact some existing water rights. It is expected that water needed in Wyoming will be obtained from Wyoming sources and water needed in Nebraska will be obtained from Nebraska sources to avoid potential interstate problems. The impact of obtaining water will be low and not significant since legal requirements of the states are followed.

#### 3.2.1.4.3 Surface Water Hydrology and Quality

This section evaluates future conditions with and without the project for stormwater runoff and drainage, erosion and sedimentation, wastewater discharge, and surface water flow.

##### 3.2.1.4.3.1 Baseline Future - No Action Alternative

###### Crow Creek Watershed.

Stormwater Runoff and Drainage. Increasing urban development will increase stormwater runoff from a 50-year, 6-hour storm in the Dry Creek basin by 3 cubic feet per second (cfs) by 1987 if stormwater management policies of the City of Cheyenne are not followed. Similar small increases in flows are expected as a result of future development in other drainage

basins in Cheyenne without the project. The peak flow from developing 512 acres of new development is expected to increase from 98 to 283 cfs. Peak flows are attenuated in overland flow such that only small changes occur in any drainage basin in Cheyenne.

Erosion and Sedimentation. Continuing construction in Cheyenne will contribute about 11,300 tons per year (T/yr) of erosion over existing conditions if construction produces 75 tons per acre (T/acre) (EPA 1982) and erosion control practices are not followed.

Wastewater Discharge. Effluent from wastewater treatment facilities will total 10,290 acre-ft in 1987 without the project and represent 93.1 percent of base flow in Crow Creek downstream of Cheyenne.

Surface Water Flow. Crow Creek may show some increased flow due to wastewater discharges and decreased pumpage in the Cheyenne wellfields. Implementation of wastewater reuse will reduce the increase in flows downstream of Cheyenne.

#### Other Areas.

Stormwater Runoff and Drainage. No major changes in watershed characteristics are expected so no change in runoff is expected.

Erosion and Sedimentation. Erosion and sediment delivery are assumed to change slightly as agricultural land is put into production in the future.

Wastewater Discharge. Some increase in wastewater effluent flows will occur as municipalities grow, but will not appreciably change present surface water hydrology or quality.

Surface Water Flow. All streams can expect some decreases in surface water flow where groundwater pumpage for irrigation reduces groundwater inflow to streams, or the streams are increasingly used for irrigation.

#### 3.2.1.4.3.2 Proposed Action

##### Crow Creek Watershed.

Stormwater Runoff and Drainage. The Proposed Action is expected to produce a small measurable change from 22 to 58 cfs from the 50 acres of new impervious surface on F.E. Warren AFB, so a low impact is determined for both the short and long term. Population-induced housing development could increase peak flow from 39 to 114 cfs from 122 acres of new development for a 50-year, 6-hour storm over baseline conditions. This level of increase will require construction of minor flood control facilities and is rated moderate both short and long term and significant due to danger to public safety from flooding. This flow would be attenuated by overland and channel flow, so that flood flows in Crow Creek would not change measurably. Thus, only slight changes to flows in Crow Creek watershed would occur during flood conditions as a result of these increases, so the impact is low and not significant for both the short and long term.

Erosion and Siltation. Erosion from construction for all project alternatives at F.E. Warren AFB is estimated at 9,900 T/yr if uncontrolled. Application of assumed mitigations reduces the impact to low and not significant. Erosion from construction, related to induced population, is estimated at 7,000 tons in 1985, the peak year of land development, without controls. These levels of increase are about 1.4-percent increases in overall watershed erosion rates of 4.1 tons per acre per year (T/acre/yr). Control of this erosion will require construction of minor



facilities so the impact is rated moderate and significant in the short term since without controls water quality regulations could be violated. The influence of changes in the Cheyenne Urban Area will have a low but significant impact in Crow Creek downstream of Cheyenne since without controls in the urban area, water quality regulations could be violated. Long-term impacts are rated negligible and not significant.

Wastewater Discharges. Wastewater discharges to Crow Creek are expected to total 10,710 acre-ft in 1987 with the project and wastewater will represent 93.4 percent of base flow in Crow Creek downstream of Cheyenne. The impact is rated as moderate in the short term since minor changes to existing facilities may be required to maintain treatment levels (Banner Associates 1982), but not significant since no public health risks would occur. The increase in wastewater flow could cause a low, not significant impact in the Crow Creek watershed in both the short and long term.

Surface Water Flow. No change in stream flow other than increasing wastewater discharges is expected with the project. Implementation of wastewater reuse as a water demand reduction alternative for the project will reduce projected increases in this discharge. The change in flow will be negligible.

#### Other Areas.

Stormwater Runoff and Drainage. A potential increase at the site level is calculated to be 2.8 percent over existing conditions, resulting in a low level of short and long-term impact that is not significant because the increase will not endanger public safety. No significant changes will occur at the local or regional level.

Erosion and Sedimentation. Erosion increases at the site level for Launch Facilities, communication cables, and Defense Access Roads will be 16 to 31 percent and 0.15 to 3.0 percent at the local level. All construction related to the project could cause increases of 0 to 1.4 percent at the regional level if erosion is not controlled. Application of assumed mitigations will result in low, not significant impacts at the site and negligible impacts for the proposed project and project alternatives at the local and regional levels.

Wastewater Discharges. Low, short-term impacts will occur due to increased operation of existing facilities to treat wastewater from immigrating people. Since public health will not be endangered the impacts are rated not significant.

Surface Water Flow. No change in surface water flow is expected as a result of the project, so impacts are rated negligible and not significant.

#### 3.2.1.4.4 Groundwater Hydrology and Quality

This section evaluates future conditions with and without the project for groundwater hydrology and quality.

##### 3.2.1.4.4.1 Baseline Future - No Action Alternative

Crow Creek Watershed. Increasing pumpage from Cheyenne wellfields could cause reduced flow in springs and in Crow Creek, as well as lower water levels in existing wells. The City of Cheyenne has determined that groundwater withdrawal rates of 2,000 acre-ft/yr for municipal use will not result in further water level declines (Cheyenne Board of Public Utilities 1983a). However, groundwater declines of 3 to 5 feet per year could result if groundwater pumpage increases to approximately 4,000 to 5,000 acre-ft/yr to meet shortages in water supply in 1983 and 1984 based on past groundwater modeling in the area (Crist 1980).

Completion of current Stage II facilities will allow recovery of the groundwater system after 1985. Continued discharges of wastewater to Crow Creek will continue to increase total dissolved solids and nitrate levels in groundwater downstream of Cheyenne, but resulting concentrations are expected to remain within water quality standards.

Other Areas. Generalized localized patterns of water level declines are expected to continue with increasing pumpage of groundwater.

#### 3.2.1.4.4.2 Proposed Action

Crow Creek Watershed. Use of the Cheyenne wellfields to meet project water demands could cause a slight decrease in water levels and a slight decrease in flow in Crow Creek.

These amounts of water level lowering which will only occur in the short term are rated as low and not significant since the lowering will not likely interfere with existing users. Use of the wells will not alter regional groundwater quality. Increases in wastewater discharges will have a low and not significant impact on groundwater quality at the local and regional level. The Proposed Action or project alternatives at F.E. Warren AFB are not expected to influence groundwater hydrology or quality.

Other Areas. The potential water level lowering 1,000 and 5,000 feet away from a construction well following 1 year of continuous pumping at 100 gpm was evaluated using equations of groundwater flow for typical aquifer parameters for the Ogallala and Arikaree aquifers with results given below:

	<u>1,000 feet</u>	<u>5,000 feet</u>
	(feet of lowering)	
Ogallala	1.5	0.02
Arikaree	3.0	0.01

These levels will only cause low and not significant impacts since the lowerings will not interfere with the existing users. Site-specific impacts at any potential project wells would need to be determined as part of water acquisition and permitting efforts (Ertec 1983).

No changes to regional groundwater quality are expected as a result of project activities in the Deployment Area.

Low, not significant impacts could occur as the result of increasing wastewater discharges in the short term at the site and local level.

The impact of wells developed to supply Deployment Area construction demands will depend on site-specific hydraulic characteristics, well construction and efficiency, and proximity to existing wells, springs, and streams. Determining precise impacts will require monitoring during construction.

#### 3.2.1.5 Summary of Impacts

This section presents a summary of impacts expected under the Proposed Action and project alternatives based on the analysis of Section 3.2.1.4 and the level of impact definitions and significance determination criteria presented in Sections 3.2.1.2 and 3.2.1.3.

#### 3.2.1.5.1 Explanation of Detailed Impact Matrix

Figure 3.2.1-2 provides a summary assessment of the level and significance of impacts to the water resource elements and subelements. The project will only cause significant impacts in the Crow Creek watershed with no significant impacts expected in the Deployment Area. Significant, short-term, moderate impacts are expected for the induced demand subelement of the water use and demand element in the local area of the Crow Creek watershed since project changes could interfere with existing users in the Cheyenne Urban Area. A significant, short-term, moderate impact is expected for the erosion and sedimentation subelement of the surface water hydrology and quality element at the local level, with a significant, short-term, low impact at the regional level. Significant short and long-term impacts are expected for the stormwater runoff and drainage subelement of the surface water hydrology and quality element since the project-induced changes in runoff could endanger public safety without mitigation.

All other project impacts in the Crow Creek watershed and in other Areas of Concentrated Study are rated not significant because with assumed mitigations they will not violate laws or regulations adopted to protect or manage the water resource system, endanger public health or safety, reduce water available to or interfere with existing users, or change preproject hydrologic baseline conditions over an extensive area or period of time.

Figure 3.0-2 shows the level and significance of impacts for each component of the Proposed Action for which alternatives have been identified including those contained in the Proposed Action. None of the project alternatives will alter impact assessments made for the Proposed Action.

#### 3.2.1.5.2 Aggregation of Elements, Impacts, and Significance

Figure 3.0-1 presents the aggregation of impacts for water resources as a whole. The only overall significant impact on water resources will occur in the short term in the Cheyenne Urban Area where a moderate level of impact is expected. All impacts on overall water resources in the Deployment Area are considered not significant and represent an overall low level of impact. Aggregation of the four water resource elements to an overall level of impact and significance rating for water resources involved weighing each aggregated element (equally) to calculate level of impact and making an overall professional judgment on the significance of water resource changes due to the project.

Aggregation of the various water resource subelements to the element level generally involved assigning the highest level of significant impact for each subelement to the element level due to potential controversy in any water development program or water resource change.

The overall water use and demand element is rated as moderate and significant due to the potential interference with water supply to Cheyenne and the need for new minor facilities to avoid this interference. The overall surface water hydrology and quality element is also rated as moderate and significant due to potential water quality and flooding problems that also require new minor facilities to avoid violations of water quality regulations and to protect public safety.

Project alternatives do not change aggregated levels of impact or significance ratings.

# WATER RESOURCES SUMMARY IMPACT MATRIX

LEVEL OF IMPACT *	LEGEND		SIGNIFICANT ADVERSE IMPACTS
	LOW	ADVERSE IMPACTS	
	MODERATE		
	HIGH		
POTENTIAL BENEFICIAL EFFECTS			
* MEASURE OF THE AMOUNT OF ENVIRONMENTAL CHANGE			

	CROW CREEK WATERSHED						OTHER AREAS					
	SHORT TERM			LONG TERM			SHORT TERM			LONG TERM		
	SITE	LOCAL	REGIONAL	SITE	LOCAL	REGIONAL	SITE	LOCAL	REGIONAL	SITE	LOCAL	REGIONAL
WATER RESOURCES	○	●	○	○	○	○	○	○	○	○	○	○
Water Use and Demand	○	●		○	○		○	○		○	○	
Construction Water Demand	○						○	○				
Induced Water Demand	○	●		○	○							
Constraints on Water Use		○					○					
Changes in Constraints												
Changes to Individual Water Rights		○					○					
Surface Water Hydrology and Quality	○	●	●	○	●	○	○	○	○	○	○	○
Storm Runoff and Drainage	○	●	○	○	●	○	○			○		
Erosion and Siltation	○	●	●			●	○			○		
Wastewater Discharges		○	○		○		○	○		○	○	
Surface Water Flow												
Ground Water Hydrology and Quality		○	○		○	○		○	○	○	○	
Interference with Springs, Wells, and Surface Flow		○								○	○	
Regional Groundwater Quality												
Wastewater Discharge Effects on Water Quality		○	○		○		○	○	○	○	○	

\* Impact is generated in the short term and has a long duration.

FIGURE 3.2.1-2 WATER RESOURCES SUMMARY IMPACT MATRIX

### 3.2.1.6 Mitigation Measures

Potential mitigation measures that will be considered are identified below. One, some, or all of the mitigation measures may ultimately be selected. Each measure identifies the party responsible to implement, but not necessarily to pay for, the measure.

- o Implementation of water conservation measures or wastewater reuse projects in the Cheyenne Urban Area or on F.E. Warren AFB to reduce raw water demand. Wastewater reuse could reduce water demand on F.E. Warren AFB by about 225 acre-ft/yr and nearly equals long-term project-related demand increases. It is difficult to determine exact reduction amounts in Cheyenne due to water conservation, but it would at least maintain per capita use at present levels. This conservation program has been initiated in Cheyenne by restructuring the water rate charge system and beginning a public education program. Water reuse projects would require construction of some facilities, and therefore design should (if selected) begin in early 1984 so that these facilities are in place at the time of peak water demand. The responsible agency for implementing these measures would be the Air Force and the Cheyenne Board of Public Utilities.
- o Operation of and/or modification to raw water collection systems in the Crow Creek watershed to increase use of the available supply. Depending on how extensive a modification to the system is selected, this mitigation could increase available supply by up to approximately 2,000 acre-ft/yr. Increasing supply would have a long-term benefit to the Cheyenne Urban Area. This measure should be implemented in early 1984 if major structures (e.g., new settling reservoirs) are required or in mid-1984 if minor facilities (e.g., new valve for Brush Creek Diversion) are selected. The responsible agency for this measure is the Cheyenne Board of Public Utilities.
- o Lease or purchase of water rights in the Crow Creek watershed to provide additional water to the Cheyenne Urban Area. This measure would require legal investigation of the water rights in question, negotiation with present owner(s) and application for change of use or location with the state engineer. In order to acquire enough water for the project, the available rights must be researched to determine which rights could be leased or purchased. This measure could be used to meet the entire project demand without major change to the area's hydrology. Since this process could require more than 1 year to change use or location, this measure should be implemented in early 1984 to meet demands in Cheyenne. The agency responsible for this measure is the Cheyenne Board of Public Utilities.
- o Use of stormwater detention facilities and/or erosion control including revegetation for all nonproject-related construction projects in the Cheyenne Urban Area. These would be in addition to the assumed mitigations implemented by the Air Force. Implementing this measure could reduce expected peak flows in the Cheyenne Urban Area to less than or equal to historic rates. Erosion control mitigation will reduce projected erosion quantities to at or below existing levels. If both were implemented, there would be little long or short-term impact on surface water hydrology in the Cheyenne area. This measure should be implemented early to maximize mitigation effects. The agencies responsible for this mitigation measure would be the Cheyenne and Laramie County Public Works departments.
- o Early implementation of plans for upgrading of wastewater treatment facilities in the Cheyenne Urban Area to reduce discharge impacts. Planning for this measure has been initiated with the facilities planning effort (Banner 1982). In order to

implement the recommendations in the plan, design should be initiated in the first quarter of 1984. Even with an accelerated schedule of design and construction it is likely that the peak population impact would have passed before the facilities are complete. However, water quality would be improved from baseline conditions. If this measure were used, the sewage treatment capacity in the Cheyenne area would be 11 million gallons per day which would easily serve the expected population. The agency responsible for implementing this measure is the Cheyenne Board of Public Utilities.

- o Siting of new wells, if any, in the Deployment Area at least 2,000 feet from existing streams and springs to minimize impacts to spring or streamflow. This mitigation measure would be implemented as new wells are needed in the Deployment Area and construction activities progress to different sites throughout the Deployment Area. This would be effective in minimizing water use impacts in the Deployment Area. The responsible agency for implementing this measure is the Air Force.
- o Increase monitoring and modeling of the Cheyenne wellfield operations and raw water supply in the Crow Creek watershed to better define production capacity. Groundwater model simulations were done for the Crow Creek wellfields and will continue to be refined into 1984. A better understanding of the impact of operations, rehabilitation or relocation of wells, and monitoring would allow the wellfields to be used to meet all project-related water demands in Cheyenne with only low or negligible effects on water resources. It would provide long-term benefit to the Cheyenne area. The responsible agency for implementing this measure is the Air Force in conjunction with the Cheyenne Board of Public Utilities.

#### 3.2.1.7 Unavoidable Adverse Impacts

Implementation of the Proposed Action will result in consumptive use of about 4,000 acre-ft of water during the 1984 through 1990 time period in the Areas of Concentrated Study. The water resource system response to this use will generally impact the water delivery system to, and wastewater discharge from, the Cheyenne Urban Area, where approximately 71 percent of the use will occur. Construction will permanently alter drainage characteristics in several drainage areas. Implementation of the Proposed Action will increase long-term water demands by about 250 acre-ft/yr in the Cheyenne Urban Area. There will be no other long-term increase in water use as a result of the project.

#### 3.2.1.8 Irreversible and Irretrievable Resource Commitments

The two irreversible and irretrievable commitments from the water resource system are a consumptive use of water and changes to drainage patterns. During construction of the project there will be 4,000 acre-ft of water consumptively used. During the operational phase of the project, 250 acre-ft/yr will be required. Drainageway characteristics altered by development will be permanently changed. While drainageways can be restored, it is not possible to return them to their exact preproject condition.

#### 3.2.1.9 The Relationship Between Local Short-Term Use of Man's Environment and Maintenance and Enhancement of Long-Term Productivity

During construction of the project, 4,000 acre-ft of water will be consumptively used and will not be available for other uses (e.g., agricultural, municipal, etc.). In the long term, an additional 250 acre-ft/yr of water will be needed as a result of the project. This amount of water would reduce available supply that could potentially be used for other beneficial purposes.

Permanent alteration of drainage patterns could potentially alter riparian habitats, change flooding patterns, and could possibly increase the productivity of some areas by reducing impacts of erosion and siltation downstream that would have existed without stormwater detention facilities, erosion control measures, and channel improvements used during the project.

### **3.2.2 Biological Resources**

#### **3.2.2.1 Introduction**

This section describes the impacts of the Proposed Action and project alternatives on vegetation, wildlife, fisheries, unique and sensitive habitats, and threatened and endangered species. A description of the criteria used to classify impacts, the criteria used to determine the significance of these impacts, and a description of the procedures used to estimate impacts are contained in the following subsections. The analysis of the environmental consequences includes an evaluation of impacts in the Region of Influence and in the Area of Concentrated Study. The Area of Concentrated Study, incorporating the ten Peacekeeper Flights and the site-specific locations within them, is based on those areas where direct impacts due to road modifications, silo upgrading, and buried cable path construction will take place. The F.E. Warren AFB portion of the Area of Concentrated Study includes those portions of the base and adjacent areas where direct impacts due to modification, upgrade, and construction of facilities for the project will take place.

The project will disturb about 1,700 acres of disturbed and undisturbed land surface (out of approximately 3,390,000 acres in the Area of Concentrated Study), and therefore cause impacts on vegetation, wildlife, and fisheries resources. The disturbed land surface within the Area of Concentrated Study is currently over 50 percent of the area. This estimate is based on an evaluation of the impacts along some 400 miles of road corridor being upgraded, of about 90 to 130 miles of cable paths, and for construction of facilities at F.E. Warren AFB. Road acreages were calculated only for road links within the Area of Concentrated Study requiring widening. Cable acreages were based on a 35-foot wide patch of disturbance. The 70 estimated acres for F.E. Warren AFB is based on evaluation of road and utility corridors as well as the approximate area to be fenced around the Weapons Storage Area and the Stage Storage Area.

Direct impacts may occur at potential ancillary facilities in the Region of Influence such as dispatch stations. A variety of direct and indirect impacts due to facility modification, upgrade, and construction for the project are expected to affect the biological resources within the Area of Concentrated Study. The direct impact levels differ between the Flights and F.E. Warren AFB within the Area of Concentrated Study. Direct impacts are a result of those project-related activities that remove areas of habitat or segments of native plant and animal populations, or create noise and movement which may cause disturbance to wildlife. Direct impacts are usually related to construction but may also occur during operation and maintenance activities. Indirect impacts are those associated with increased human population and activities not directly related to project construction, operation, and maintenance. Short-term impacts are those generated during construction/modification activities prior to 1990, but may also occur during operation. Long-term impacts are those generated during the operational phase of the Peacekeeper project. These impacts may be of long or short duration as discussed in Section 3.2.2.2.

Baseline future projections of human population were considered, when appropriate, in the evaluation of impact levels for biological resources. This evaluation included a qualitative review of past human activity on the natural biological systems in the Region of Influence and the Area of Concentrated Study. It also included qualitative assessment of the potential effect of the projected human population increases on the biological resources of the study areas. Project impacts, short and long term, are assumed to be incremental over and above existing and future baseline conditions. This approach is based on the concept that the biological resources have been adversely affected by past human activity and that project-specific



impacts will add incremental impact levels that will continue above any future baseline projections. Such incremental impacts are considered to aggravate the continuing problem of the declining condition of the natural biological environment.

The Defense Access Road resurfacing Options A and B (partial paving, or paving, of Defense Access Roads, respectively) will not produce different biological impact levels between options. Therefore, these options are not separated in discussions of road upgrade/modifications. The information in this section is based upon data and detailed analysis contained in the Biological Resources Environmental Planning Technical Report.

#### 3.2.2.2 Definition of Level of Impact

Level of impact is a measure of environmental change resulting from the project as compared to the projected baseline. Impact levels were developed to classify potential direct and indirect impacts generated by the project. The impact evaluations are made independently of the determination of significance and are not affected by that determination. The impact levels were derived from an impact evaluation model (described in Biological Resources EPTR, Section 3.3.1) based on the following characteristics:

- o Susceptibility - Degree of response to change based, as appropriate on an evaluation of the quantified areal extent, on quantifiable, elements of composition, and/or on the relative condition of the habitats/species present.
- o Habitat Quality - Value of the habitat for support of plant and animal populations based on existing disturbance levels which may be quantified, when appropriate, on the basis of the percent composition of weedy species, grazing pressure indicator species, or indicators of early successional stages.
- o Quantity - Amount of a natural system potentially disrupted due to project activities.
- o Duration - The time over which a disturbance occurs plus the time necessary for recovery of a resource following a disturbance. Long duration is a disturbance time plus recovery time which will exceed 5 years. Short duration is a disturbance time plus recovery time which will take less than 5 years.

The impact levels include an evaluation of appropriate assumed mitigations.

The impact model (Biological Resources EPTR, Sections 3.3 and 3.4) used in this analysis provides a structure for development of the impact levels. The impact levels developed through the model include negligible, low, moderate, and high impacts. Examples of typical impact levels, developed using quantified input when appropriate, as summarized from the impact model are:

- o Negligible Impact - Would result if impacts occurred and the susceptibility, quantity, duration, and habitat quality characteristics are all low.
- o Low Impact - Would generally affect widespread habitats with low diversity or areas that are highly modified or degraded (usually by human activities). Low impacts can be short or long in duration and usually affect relatively low amounts of the available habitat or population.

- o **Moderate Impact** – Would generally affect diverse habitats, habitats supporting species of state concern, special wildlife use areas, or vegetation/habitat types of regionally limited areal extent. Moderate impacts are usually long in duration, but can be of short duration.
- o **High Impact** – Would generally result in disruption or loss of highly unique vegetation/habitat types, habitats that are relatively unmodified, or habitats of federally listed threatened or endangered species. High impacts are usually long but can be short in duration.

For further information on the development of impact levels, see Sections 3.1, 3.3, and 3.4 of the Biological Resources EPTR.

### 3.2.2.3 Determination of Significance Criteria

The term significant is used as a measure of the importance of the impact, and does not necessarily imply a separate judgment on the overall severity of the impact. Rather, it may indicate a judgment regarding which impacts warrant heightened attention, by the Air Force or others, during project planning; or it may reflect a judgment as to the extent of the action necessary to avoid that impact.

The determination of significance for biological resources involves the evaluation of the context in which the impact may occur, and the intensity and extent of the impact effect. Potential impacts are assessed as significant or not significant in a site-specific, local, and regional context. Evaluations determining an impact to be significant or not significant also include an assessment of intensity (severity criteria) and extent (in time and space).

Intensity is based on *relative changes*:

- o To the unique characteristics of the area (wetland, ecologically critical areas);
- o That are likely to be controversial (Examples of impacts considered to be controversial include those for which there is a likelihood of a substantial dispute, those about which segments of the public indicate substantial concern, or those which have been found to be controversial on other projects.);
- o In cumulative impact;
- o That are likely to adversely affect threatened, endangered, or otherwise unique species; and
- o In resources considered to be important or valuable from the perspective of scientific opinion and management agency concerns.

Extent is related to:

- o The area/quantity of a resource affected relative to the area/quantity of a resource available;
- o The potential for change in reproductive success and maintenance of a population at preproject levels; and
- o The duration of time during which recovery will occur.

A finding of significance for a particular impact can be based on one or more of the intensity (severity) and extent criteria as well as the context in which it occurs. The determination of significance is made independently of the evaluation of impact level and is not affected by that evaluation.

#### **3.2.2.4 Assumptions, Assumed Mitigations, and Environmental Impacts of the Proposed Action and Project Alternatives**

**Assumptions.** The evaluation of impacts on biological resources included the use of several assumptions. Some representative assumptions are:

- o While a mitigative modeling and monitoring program for the Cheyenne wellfield is under development by the water resources group, it is assumed that increased pumping of the Cheyenne wellfield could affect the riparian vegetation along Crow Creek by lowering the water table.
- o Workforce immigrants will increase fishing and hunting pressures proportionately within the Region of Influence.
- o Use of aggregate sources within the Area of Concentrated Study or the Region of Influence may affect fish and wildlife resources.
- o Dispatch stations will be in urban or urbanizing areas, will have been subjected to some previous disturbance, and will not be in riparian/floodplain habitats.

**Assumed Mitigations.** In addition, it is assumed that in conformance with normal construction practices, certain mitigation measures will be carried out. These assumed mitigations, the potential disturbances, suggested mitigations, and the existing conditions were analyzed in an impact evaluation model and an impact assessment and mitigation planning chart to determine impact levels and residual adverse impacts/beneficial effects (Sections 3.1, 3.5.1 through 3.5.3 of the Biological Resources EPTR).

There are three categories of biological resources mitigations including: 1) planning, 2) design and construction commitments, and 3) others. Implementation of several of the assumed mitigations has been initiated in the area of planning and design instructions. The implementation of these mitigations is reflected in the determination of levels of expected impacts on biological resources and endangered species within the Area of Concentrated Study.

The Air Force will be responsible for these assumed mitigation measures which include the following provisions:

##### **Planning**

- o Conduct work in streams in a manner that minimizes siltation and erosion;
- o Conduct surveys of potential black-footed ferret habitat and include results in early planning processes by utilizing maps of prairie dog towns within the Area of Concentrated Study to avoid disturbance to identified black-footed ferret habitat;
- o Within mission design and budget constraints, have minimal disturbance to rare plant populations and wildlife species; minimize erosion, surface disturbances, and removal of trees (raptor roosts/nests);

- o Conduct a site-specific biological inventory and survey of cable paths providing the necessary data base to plan appropriate avoidance or minimization of installation impacts on the sensitive vegetation types (riparian, meadow, shrubland, and woodland) along these paths. The results will be used to position the centerline of the cable right-of-way in the most environmentally compatible location within mission and design criteria; and
- o Conduct a site-specific biological inventory and survey of culvert upgrade and other road modification locations wherever these potential actions intersect or parallel the sensitive vegetation zones on F.E. Warren AFB.

#### Design and Construction Commitments

- o Have a qualified biologist/botanist work with the design contractor during the design of the onbase roads, bridges/culverts, and other facilities;
- o Maintain a separation distance of at least one-half mile between cable right-of-way and identified raptor nest sites within mission and design requirements;
- o Install stream crossing facilities such that there is minimal disturbance of critical Colorado butterfly plant habitat or downstream hydrology on F.E. Warren AFB;
- o Provide criteria at start of design to be included in contract provisions to set forth requirements to minimize disturbance within and adjacent to the Area of Concentrated Study;
- o Utilize erosion controls during construction activities;
- o Restrict vehicle use off-road by the construction workforce in the the project vicinity during working hours;
- o Restrict use of firearms in construction areas;
- o Revegetate with quick growing native species as appropriate for short-term soil stabilization;
- o Revegetate with native plants for long-term recovery;
- o Control dust during construction;
- o Construction lay down areas at stream crossings will not be placed in riparian or other sensitive habitats;
- o Restrict vehicle maintenance activities to areas away from stream banks; and
- o Install the cable so as to restore the top soil and associated seed sources when back filling.

#### Other

- o Have a qualified biologist/botanist act as an advisor to the Construction Monitor to provide direct onsite input to ensure the contractor's compliance with mitigation stipulations in biologically sensitive areas;

- o Individual Colorado butterfly plants that would be covered or damaged by stream-crossing facilities will be transplanted on an experimental basis to adjacent areas that support or may potentially support the species; and
- o Minimize the spread of noxious weeds as appropriate, exercising caution in and adjacent to Colorado butterfly plant habitat.

**Environmental Impacts.** Environmental impacts of the Proposed Action and project alternatives are discussed in the following subsections.

#### **3.2.2.4.1      Vegetation**

##### **3.2.2.4.1.1      Baseline Future - No Action Alternative**

Past and current trends in human population-related impacts on the native vegetation resources will be expected to continue into the future. Native vegetation communities will continue to be impacted by human demands such as grazing, agriculture, and other land use developments. Quantity and quality of native vegetation will continue to decline. The rates of change will be dependent on management agency and public perceptions of value, usefulness, and/or extent of the resource. Under normal conditions, populations vary in size over time due to natural successional changes, unpredictable weather, wild fire, and floods. Future baseline is expected to continue with the same type of vegetation changes brought about by urban and agricultural land use, wildlife habitat, and recreation management policies that influence native vegetation at present. Therefore, the existing conditions are assumed to reflect the general conditions for the future with the expectation that there will be increasing land use and recreational pressures.

##### **3.2.2.4.1.2      Proposed Action**

Analysis of impacts on vegetation is based on the future baseline conditions. Direct project-related disturbances will be restricted to the Area of Concentrated Study and closely adjacent areas. Therefore, no significant impacts on vegetation are anticipated within the broader Region of Influence. Road modifications in and adjacent to the Flights will disturb short-grass prairie, shrubland, meadow, rock outcrop, woodland, and riparian vegetation. Impacts on riparian vegetation are discussed in Section 3.2.2.4.1 except for specific mention relative to cable path alternative in this section. Short-term impacts to short-grass prairie and meadow vegetation types will be associated with increased dust from vehicle movement, increased localized erosion, and unauthorized offsite, off-road vehicle activity. Long-term impacts will result from permanent removal or burial of any of these types of vegetation and from off-road vehicle use in shrubland, woodland, and riparian types. The long-term impacts to short-grass prairie will be negligible and not significant since it is regionally abundant and in most areas subjected to grazing pressure. Short and long-term impacts to rock outcrop vegetation will be low but significant because the vegetation type is considered to be a unique characteristic of the area, limited in distribution regionally, and the recovery period of this vegetation may be of relatively long duration. With application of the appropriate assumed mitigations, short and long-term direct impacts to shrubland, woodland, and meadow vegetation will be significant, and low. The impacts on these vegetation types are significant because of their limited areal extent and scattered (mosaic-like) distributions. The abundance and distribution of these vegetation types is limited due to the infrequent occurrence of suitable soil factors in both the Region of Influence and Area of Concentrated Study.

Direct project-related disturbance to short-grass prairie may occur at the 58 silo sites where native vegetation is present. These impacts would be negligible and not significant due to the low acreages affected and the regional abundance of short-grass prairie.

Disturbance to vegetation adjacent to the 11 cable paths will occur primarily where 35-foot wide easements across private land are necessary. The types of impacts occurring in these areas will be similar to those described for road corridors, with the addition of trenching activities and increased potential for erosion-related impacts. Impact levels for vegetation types potentially disturbed within the cable paths will be the same as those identified for the road corridors. Estimated impact levels for the preferred cable paths (Figure 3.0-2) are negligible for PA1, significant, low, and short and long term for PA4, and significant, moderate, and short term for PA5, SB1, and RB1. Impacts on PA5 and RB1 are also estimated to be significant, low, and long term, while impacts for SB1 will be significant, moderate, and long term. Estimated impact levels for the six alternative cable paths are negligible for PA2; significant, low, and short and long term for SB2 and RB2; and significant, moderate, and short term for PB1, PA3, and PD1. Long-term impacts on PB1, PA3, and PD1 are estimated to be significant and low. Significant, moderate, and short-term impacts are generally related to the presence of riparian vegetation along the cable paths. However, significant, moderate, and short and long-term impacts along cable path SB1 are a result of the presence of a state (Wyoming) rare plant, the woolly milkvetch.

New construction of any of the road configurations, R1, R2, or R3, and other modifications of proposed Peacekeeper facilities on F.E. Warren AFB, will result in short and long-term impacts to mixed-grass prairie vegetation. Short-term low impacts will result from increased dust levels, potential erosion and vehicle turning movements during construction, while long-term moderate impacts will result from the permanent removal and burial of mixed-grass prairie vegetation. The impacts to mixed-grass prairie on F.E. Warren AFB will be significant because this vegetation type occurs infrequently within the Region of Influence and Area of Concentrated Study. In addition, mixed-grass prairie vegetation on F.E. Warren AFB is relatively unique since it has not been grazed for over 25 years.

Impacts to the meadow vegetation within the F.E. Warren AFB portion of the Area of Concentrated Study, due to construction modifications and upgrading of roads and utilities, will be moderate and significant because it is a limited resource. These impacts may be short term if disturbed areas are revegetated using the appropriate assumed mitigations. However, long-term impacts can be expected in those areas where habitat is eliminated by road expansions.

Impact levels associated with aggregate quarry sites may vary depending on the vegetation types present and the amount of disturbance. Due to the small acreages involved, the dispatch station alternatives and overpass modifications are expected to result in negligible impacts.

Overall impact levels on vegetation will be short and long term, significant, and low within the Flight areas; and significant, moderate, and short and long term on F.E. Warren AFB, due to loss or disruption of vegetation.

#### 3.2.2.4.2 Wildlife

##### 3.2.2.4.2.1 Big Game

Baseline Future - No Action Alternative. Big game resources under normal conditions tend to vary in population size over time (and location) due to range or habitat condition, unpredictable weather conditions, disease, and annual hunting pressures. Currently, Wyoming pronghorn populations within the Area of Concentrated Study are stable except in the Iron Mountain herd unit where populations are decreasing. In the Nebraska portion of the Area of Concentrated Study, pronghorn numbers are increasing. Mule deer and white-tailed deer populations are generally increasing in management herd units within the Area of

Concentrated except in the Wyoming Iron Mountain unit where populations are decreasing slightly. Human population related pressures have caused almost every big game population (species) to come under some degree of direct or indirect human management. Management agencies' goals are to maintain these populations in an approximate equilibrium with the available habitat that can support them. These goals may allow varying levels of annual harvest in this equilibrium or may just permit preservation of the species. Management goals may also include habitat (vegetation) restoration or preservation of specific habitat types that are important or critical to the species survival. Trends in population size for the most actively managed species will vary depending on the agency perception of the need to increase, decrease, or maintain a specific population. These perceptions and goals can and do vary over time because of public and private agency concerns, pressures, and/or perceptions of value, usefulness and or extent of the resource. Therefore, the existing conditions are assumed to reflect the general conditions for the future with expectation that there will be increasing land use and recreational pressures.

Proposed Action. Analysis of impacts on big game is based on the future baseline conditions. The determination of significance for impacts to big game is based on an evaluation of the potential for increased hunter take in unlimited permit areas and the potential for increased game violations because these influence the maintenance or preproject population levels.

The majority of project impacts within the Region of Influence are considered indirect and are due to human population increases. Increased hunting pressure is likely to accompany this population growth. Hunting licenses are issued on a limited basis for most big game species, therefore big game legal harvests would not be affected (Biological Resources EPTR, Section 3.5.2.1). Short-term, low, and significant impacts are likely to occur within the Wyoming Region of Influence to deer, elk, and black bear populations where general licensing occurs. Impacts to these species are considered low level because the project is expected to increase Wyoming hunting days by 1 percent (Wyoming Game and Fish Department [WGFD] 1982c).

Poaching, dog kills (big game mortalities due to domestic dogs), vehicle collisions with big game, and general recreation pressures are also likely to increase with human population growth, resulting in short-term impacts to big game within the Region of Influence. Low-level impacts which will be significant regionally are anticipated for each of these effects, except in those areas of concentrated recreation pressures such as off-road vehicle use, snowmobiling, and camping where significant, moderate impacts may occur.

Long-term permanent and short-term temporary habitat loss due to upgrading of Defense Access Roads, and any of the 11 cable path alternatives will occur in the Area of Concentrated Study. However, due to the minimal amounts of big game habitat that will be affected, impacts will be negligible. Construction disturbances such as noise and vehicle movement, increases in poaching, and vehicle collisions within the Area of Concentrated Study are expected to result in short-term, significant, and low-level impacts in regard to pronghorn, mule deer, and white-tailed deer at silo sites. The impacts would be greatest in areas of relatively sensitive habitat. No project-related impacts are expected on elk, black bear, and mountain lion in the Area of Concentrated Study. Short and long-term impacts due to habitat loss (winter-yearlong and yearlong), and short-term construction disturbance may cause significant, low-level impacts to big game species using F.E. Warren AFB.

Impacts to big game associated with base circulation road Alternatives R1, R2, or R3, and other proposed facilities modifications on F.E. Warren AFB, will be low and significant. Habitat loss and construction activity impacts at aggregate quarry sites will vary depending on the quality of big game habitat affected. Impacts associated with dispatch stations and overpass modifications will be negligible.

Overall impact levels for big game will be short and long term, low, and significant due to construction activity disturbances and loss of habitat in the Flight portion of the Area of Concentrated Study and at F.E. Warren AFB. Short-term impacts in the Region of Influence will be significant and moderate due to increased recreation pressures at areas currently receiving heavy recreational pressures.

#### 3.2.2.4.2.2 Furbearers, Upland Game, and Waterfowl

Baseline Future - No Action Alternative. Furbearer, upland game, and waterfowl resources, under normal conditions, tend to vary in population size over time and location due to range or habitat condition, unpredictable weather conditions, disease, and annual hunting and trapping pressures. Human population related pressures have caused almost all of these species to come under some degree of direct or indirect human management. Management agencies goals are to maintain these populations in an approximate equilibrium with the available habitat that can support them. These goals may allow varying levels of annual harvest in this equilibrium or may just permit preservation of the species. Management goals may also include habitat (vegetation) restoration or preservation of specific habitat types that are important or critical to the species survival. Trends in population size for the most actively managed species will vary depending on the agency perception of the need to increase, decrease, or maintain a specific population. These perceptions and goals can and do vary over time because of public and private agency concerns, pressures, and/or perceptions of value, usefulness, and/or extent of the resource. Therefore, the existing conditions are assumed to reflect the general conditions for the future with the expectation that there will be increasing land use and recreational pressures.

Proposed Action. Analysis of impacts on furbearers, upland game, and waterfowl is based on the future baseline conditions. No direct impacts will affect furbearers, upland game, and waterfowl within the Region of Influence. However, indirect impacts such as increased hunting and trapping may occur within the Region of Influence and Area of Concentrated Study. The increase in hunting and trapping pressures for most species will be short term and low level but not significant. Poaching may increase, but will result in low, short-term, not significant impacts. No hunting or public trapping is permitted on F.E. Warren AFB, however, the Air Force does allow a restricted trapping program within the base.

The direct impacts due to construction of the defense access roads and any of the 11 cable path alternatives on furbearers, upland game, and waterfowl due to loss and disturbance of aquatic and riparian habitats within the Area of Concentrated Study will be short and long term, and low level, but not significant. Impacts associated with any of the road configurations R1, R2, or R3 and other proposed facilities modifications on F.E. Warren AFB will be short and long term, low level, but not significant. Reduction of other habitats will not adversely affect these species groups. Impact levels at proposed aggregate quarry sites will be similar to those discussed above. Habitat modification or loss associated with the dispatch station alternatives will be negligible. Overpass modifications will also result in negligible impacts to these species.

Overall impacts on furbearers, upland game, and waterfowl will be short and long term, low and not significant throughout the Area of Concentrated Study due to loss and disturbance of aquatic and riparian habitat, increases in hunting and trapping pressures, and poaching. The impacts will be low and not significant in the Region of Influence for the short term because of increases in hunting and trapping pressures and poaching.



#### 3.2.2.4.2.3

#### Nongame Mammals, Other Birds, Reptiles, and Amphibians

**Baseline Future - No Action Alternative.** Nongame mammals, other birds, reptiles and amphibians resources, under normal conditions, tend to vary in population size over time (and location) due to range or habitat condition, unpredictable weather conditions, disease, and illegal hunting pressures. Human population related pressures have caused some species of several of these groups to come under some degree of direct or indirect human management. Management agencies' goals are to maintain these populations in an approximate equilibrium with the available habitat that can support them. These goals may help to preserve the species in this equilibrium. Management goals may include habitat (vegetation) restoration or preservation of specific habitat types that are important or critical to the species survival. Trends in population size for the most actively managed species will vary depending on the agency perception of the need to increase, decrease, or maintain a specific population. These perceptions and goals can and do vary over time because of public and private agency concerns, pressures, and/or perceptions of value, usefulness, and/or extent of the resource. Therefore, the existing conditions are assumed to reflect the general conditions for the future with the expectation that there will be increasing land use and recreational pressures.

**Proposed Action.** Analysis of impacts on nongame mammals, other birds, reptiles and amphibians is based on the future baseline conditions. The proposed project will have negligible impacts on populations of nongame mammals, other birds, and reptiles and amphibians in the Region of Influence. Construction within the Area of Concentrated Study, including construction of defense access roads, any of the 11 cable path alternatives, and the road configurations R1, R2, or R3 and other proposed facilities modifications on F.E. Warren AFB could result in the direct loss of individuals unable to move away from construction-impacted areas. Habitat loss for these wildlife groups is expected to be a negligible impact, due to the relatively broad distributions of each group. In addition, they generally have high reproductive rates and may reinvade disturbed areas as revegetation occurs. Therefore, no long-term impacts are anticipated for these wildlife groups. The negligible impact level is based on the assumption that individuals of these groups are widely scattered within their distributions and that the probability of impacting individuals will be low. However, these predicted negligible impact levels may be moderate and significant if unique/rare species, such as the pale milk snake and meadow jumping mouse, occur within the construction areas and are affected. Impacts associated with aggregate quarries, dispatch station area alternatives, and overpass modifications on these four wildlife groups will be negligible.

Overall impact levels on nongame mammals, other birds, and reptiles and amphibians in the Area of Concentrated Study and the Region of Influence are negligible during the short and long term because of the relatively broad distributions and high reproductive rates of these species.

#### 3.2.2.4.2.4

#### Raptors

**Baseline Future - No Action Alternative.** Raptor resources under normal conditions tend to vary in population size over time (and location) due to habitat condition, unpredictable weather conditions, disease, and random shooting. Most of the raptor populations in the Area of Concentrated Study are stable or increasing. However, the Swainson's hawk and ferruginous hawk are currently declining in numbers. Human population-related pressures have caused raptor populations (species) to come under some degree of direct or indirect human management. Management agencies goals are to maintain these populations in an approximate equilibrium with the available habitat that can support them. Goals may be limited to preservation of the species and/or may also include habitat (vegetation) restoration or preservation of specific habitat types that are important or critical to the species survival.

Trends in population size for the most actively managed species will vary depending on the agency perception of the need to increase, decrease, or maintain a specific population. These perceptions and goals can and do vary over time because of public and private agency concerns, pressures, and/or perceptions of value, usefulness, and/or extent of the resource. Therefore, the existing conditions are assumed to reflect the general conditions for the future with the expectation that there will be increasing land use and recreational pressures.

Proposed Action. Analysis of impacts on raptors is based on the future baseline conditions. The determination of significance for impacts to raptors as discussed in this section is based on potential project impacts that may effect maintenance or increases of a population at or above preproject levels.

Random (indiscriminate) shooting is a major mortality factor affecting raptors (Newton 1979), and may increase within the Region of Influence and Area of Concentrated Study. The impact will be short term, significant, and low-level, depending upon the magnitude of the increase in shooting and the species involved. Moderate impacts may occur in the short term during peak population years. Evaluation of biological data and operational work force levels indicate that the regional long-term impact of random shooting of raptors is expected to be low in the Area of Concentrated Study and the Region of Influence.

Direct impacts to raptors are likely to occur within the Area of Concentrated Study due to construction of Defense Access Roads and any of the 11 cable path alternatives and the road configurations R1, R2, or R3 and other proposed facilities modifications on F.E. Warren AFB. These impacts include disturbance to nesting raptors and important habitat components such as trees and small mammal burrows. Twenty-six known raptor nests are located within 1 mile of access roads or silos. Disturbances such as noise and movement near active nests may cause low, significant, and short-term impacts with appropriate assumed mitigations due to disturbance of nesting activity. With the implementation of appropriate assumed mitigations impacts to raptors caused by the removal of trees in riparian and woodland habitats will be significant, short and long term, and low level. Due to the rare status of the burrowing owl, loss of small mammal burrows could remove potential habitat causing a short-term, low, significant level of impact on this species within the Area of Concentrated Study.

Construction activity during the raptor breeding season may cause significant, short-term, moderate impacts to the Swainson's hawk nest located adjacent to the southern east/west road (Happy Jack Road alignment) alternatives (R1 and R2) near Gate No. 2 on F.E. Warren AFB. Impacts associated with construction activity such as noise and vehicle movement along the north/south road (Alternatives R2 and R3) across Diamond and Crow creeks may be low level, significant, and short and long term.

Impacts associated with the 11 cable path alternatives may also be short term, low, and significant. Impacts due to activities at aggregate quarry sites may vary depending on the potential for the disruption of nesting activity. Impacts associated with dispatch stations and overpass modifications will be negligible.

Overall impacts on raptors will be moderate and significant for the short term in all areas because of an increase in the potential for random raptor shooting and disturbance to nesting. Long-term impacts will be low and significant in all areas because of the loss of raptor habitat and the increased potential for random raptor shooting.

### **3.2.2.4.3 Fisheries Resources**

#### **3.2.2.4.3.1 Baseline Future - No Action Alternative**

Fisheries resources under normal conditions tend to vary in population size over time (and location) due to habitat conditions, unpredictable changes in stream flows, disease, and annual fishing pressures. Human population-related pressures have caused many fish species to come under some degree of direct or indirect human management. Management agencies' goals are to maintain these populations in an approximate equilibrium with the available habitat that can support them. These goals may allow varying levels of annual take within this equilibrium or may just permit preservation of the species. Management goals may also include habitat restoration, improvement measures, and preservation of specific habitat types that are important or critical to the species survival. Trends in population size for the most actively managed species will vary depending on the agency perception of the need to increase, decrease, or maintain a specific population. These perceptions and goals can and do vary over time because of public and private agency concerns, pressures, and/or perceptions of value, usefulness, and/or extent of the resource. Therefore, the existing conditions are assumed to reflect the general conditions for the future with the expectation that there will be increasing land use and recreational pressures.

#### **3.2.2.4.3.2 Proposed Action**

Analysis of impacts on fisheries is based on the future baseline conditions. The determination of significance for fisheries is generally based on need to protect and maintain the fisheries. These concerns include the potential effects of increased fisherman take on the available resource and the need for increased management of the resource through increased stocking or restrictions on take as well as construction-related impacts to streams.

Aquatic resources in the Region of Influence will not be impacted directly by construction activities. Fishing opportunities in the Region of Influence may decline due to the estimated increase in the fishing population projected for the period of project construction. A significant, short-term, low impact may occur on waters that are currently overfished or at fishing capacity. Long-term impacts due to increased fishing pressure in the Region of Influence are expected to be negligible.

Construction activities within the Area of Concentrated Study may potentially cause significant, low, short-term impacts on streams within this area. Aquatic resources that may be impacted by expansion and improvement of defense access roads include Chugwater, Horse, Bear, and Lodgepole creeks. Increased siltation will be the main impact during construction of defense access roads and the cable paths at perennial stream crossings. The impact level of increased turbidity on aquatic organisms (Biological Resources EPTR, Section 3.5.3.2) from these construction-related disturbances is expected to be significant, short term, and low. Implementation of the assumed mitigation measures (restriction of vehicle maintenance activities to areas away from stream banks, and the placement of construction lay down areas outside of riparian or other sensitive areas) will prevent petroleum spills within streams. Therefore, the impacts are expected to be negligible and not significant. However, in the event of an accidental petroleum spill (motor oil, gasoline, and diesel fuel), impacts due to water quality changes may be short term, low level, and significant. Impacts from habitat degradation due to construction activity in stream beds are expected to be significant, low level, and short term.

Horse, Little Horse, and Bushnell creeks may be impacted by installation of the cable path Alternatives RB1, PD1, PA3, PA5, and PB1. Impacts to aquatic resources along these cable paths may be significant, short term and low level. The remaining six cable path alternatives will cross intermittent drainages and are expected to have negligible impacts.

Increased fishing pressure on perennial streams in the Area of Concentrated Study such as Horse, Richeau, Chugwater, and Little Horse creeks may result from localized population increases. Depending on the current resource availability in these areas, expected impacts may be significant, short term, and low level.

Construction activities, related to construction of any of the road configurations R1, R2, or R3 and other proposed facilities at stream crossings on Diamond and Crow creeks on F.E. Warren AFB, may impact these streams. Increased turbidity levels are expected to have significant short-term, low-level impacts on aquatic organisms in Diamond and Crow creeks.

Sand and gravel removal adjacent to perennial streambeds may impact aquatic resources in and adjacent to the aggregate quarries. Short-term impacts such as increased turbidity levels may occur as a result of the sand and gravel removal. Borrow pits created by sand and gravel removal may provide improved fish habitat and fishing opportunities for the public if properly designed and managed.

The alternative dispatch stations are not expected to be placed in or adjacent to any stream drainages. Consequently, no direct construction-related activities from the dispatch stations are expected to impact aquatic resources in the study area. Overpass modifications will not affect aquatic resources.

Overall impact levels on the fisheries will be low and significant in the short term in the Flight Areas and on F.E. Warren AFB due to construction-related disturbances such as increased siltation and potential habitat loss. Impact levels due to increased fishing pressures are expected to be short term, significant, and low level in the Flight Areas and Region of Influence. Long-term impacts on fisheries are anticipated to be negligible.

#### 3.2.2.4.4 Unique and Sensitive Habitats

##### 3.2.2.4.4.1 Vegetation

Baseline Future - No Action Alternative. Past and current trends in human population-related impacts on the unique and sensitive vegetation resources will be expected to continue and be a representative projection of future baseline. Unique and sensitive vegetation communities continue to be impacted by human demands such as grazing, agriculture, and other land use developments. Quantity and quality of unique and sensitive vegetation continues to decline. The rates of change are dependent on management agency and public perceptions of value, usefulness, and/or extent of the resource. Under normal conditions, populations vary in size over time due to natural successional changes, unpredictable weather, wild fire, and floods. Future baseline is expected to continue with the same type of vegetation changes brought about by urban and agricultural land use and wildlife habitat and recreation management policies that influence unique and sensitive vegetation at present. Therefore, the existing conditions are assumed to reflect the general conditions for the future with the expectation that there will be increasing land use and recreational pressures.

Proposed Action. Analysis of impacts on unique vegetation is based on the future conditions. The impacts are significant because of the unique character of the vegetation. Riparian zones in the Area of Concentrated Study may be adversely affected due to construction-related disturbances. Disturbance to riparian and associated wetland areas will constitute significant,

moderate, short-term impacts within the Flights and on F.E. Warren AFB. Impacts to riparian and wetland areas are significant due to specific concerns stated in the Council on Environmental Quality regulations such as, "unique characteristics of the geographic area such as the proximity to...wetlands...or ecologically critical areas." Short-term impacts on riparian areas associated with defense access road and cable installation activities include loss of vegetation and increased erosion potential. Long-term impacts reflect the length of time required for revegetation and recovery of the tree and shrub components of riparian and wetland habitats after disturbance. Disturbance impacts to riparian vegetation will be significant and moderate in the short term and significant and low level in the long term.

Impacts related to project activities will have a significant, moderate shortterm impact and a significant, low-level, long-term impact on riparian vegetation along Crow and Diamond creeks on F.E. Warren AFB. These impacts will be short and long term, primarily due to the length of time necessary for recovery of shrubs and trees following disturbances and to the loss of riparian habitat due to the expansion, modification, and construction of roads. The riparian vegetation also provides known areas of habitat for the U.S. Fish and Wildlife Service Category One species, the Colorado butterfly plant, as well as potential habitat for expansion of the species population. Impacts which will be significant and which could also affect riparian vegetation in an unnamed drainage near Cheyenne Road and Parade Avenue on F.E. Warren AFB will be moderate over the short term and low level during the long term.

With implementation of the appropriate assumed mitigations, the three alternative new road configurations, i.e., R1, the Proposed Action R2, and R3, including the offbase circulation corridors, will have moderate, short-term and low-level, long-term, significant, and site-specific impacts to riparian habitat. These impacts will be significant because of the unique character, limited distribution of the riparian vegetation within the region, and its relatively high quality as a result of the general protection afforded by being on F.E. Warren AFB. The offbase impacts are negligible and not significant at the Interstates 25 and 80 interchanges and along Round Top Road south of the F.E. Warren AFB boundary. Low and moderate impacts in both the short and long term which are significant on riparian vegetation will occur at Crow and Diamond creeks, along the Proposed Action north/south roadway alignment which are portions of the R2 and R3 alternatives. High, short and long-term significant impacts will occur at the Crow and Diamond creek crossings on the Round Top Road design option due to the potential for increased disturbance to the stream bed and flow characteristics that may affect downstream riparian habitats. Alternatives R1 and R2 will also have moderate, short-term and low-level long-term significant impacts on riparian habitat at an unnamed drainage on the southern roadway alignment although the impact will be somewhat lower than that at the Crow and Diamond creek crossings. With implementation of the appropriate assumed mitigations, the east/west roadway (Happy Jack Road alignment) associated with the R1 and R2 alignments will have moderate, short-term and low-level long-term significant impacts on riparian vegetation at the Crow Creek crossing near base Gate No. 2. Impacts on riparian vegetation due to expansion of the cone of depression due to water level lowering around the Cheyenne wellfield (as described in Water Resources, Section 3.2.1.4.4.2) are expected to be short and long term, low, and significant. With implementation of the appropriate suggested mitigations, the impacts would be negligible.

If riparian vegetation is present at aggregate quarry sites, impact levels may vary depending on the amount of disturbance. If riparian vegetation occurs near potential dispatch stations, impacts may occur. However, due to the small acreages involved this will be a negligible impact. No impacts on riparian vegetation are expected to occur because of proposed overpass modifications.

Overall impact levels on unique and sensitive vegetation in the Flight and F.E. Warren portions of the Area of Concentrated Study are significant and moderate during the short term, and significant and low level during the long term because of vegetation loss and habitat disturbance.

#### 3.2.2.4.4.2 Wildlife

Baseline Future - No Action Alternative. Unique and sensitive wildlife species and habitat resources, under normal conditions tend to vary in population size over time (and location) due to range or habitat condition, unpredictable weather conditions, and disease. Human population-related pressures have caused most unique and sensitive wildlife populations (species) to come under some degree of direct or indirect human management. Management agencies' goals are to maintain these populations in an approximate equilibrium with the available habitat that can support them. These goals may include just preservation of the species. Habitat (vegetation) restoration and/or preservation of specific habitat types that are important or critical to the species survival. Trends in population size for the most actively managed species will vary depending on the agency perception of the need to increase, decrease, or maintain a specific population. These perceptions and goals can and do vary over time because of public and private agency concerns, pressures, and/or perceptions of value, usefulness, and/or extent of the resource. Therefore, the existing conditions are assumed to reflect the general conditions for the future with the expectation that there will be increasing land use and recreational pressures.

Proposed Action. Analysis on unique and sensitive wildlife habitat is based on the future baseline conditions. No significant impacts are expected to occur to unique or sensitive wildlife habitat within the Region of Influence from the Proposed Action. Pronghorn migration route and/or mule deer critical winter-yearlong habitat loss associated with project activity within the Area of Concentrated Study will result in negligible impacts, due to the minimal quantity of habitat that may be affected along access roads and at silo sites. There is no unique and sensitive wildlife habitat within any of the 11 cable path alternatives or on F.E. Warren AFB.

Impact levels at aggregate quarries sites may vary depending upon the extent of disturbance to big game critical winter-yearlong habitat and migration routes. No unique or sensitive wildlife habitats are expected to occur in the vicinity of proposed dispatch stations. Overpass modifications will result in negligible impacts to unique or sensitive wildlife habitat.

Overall impacts on unique and sensitive wildlife habitat in the Flight and F.E. Warren portions of the Area of Concentrated Study, and the Region of Influence are negligible in the short and long term because of the minimal quantity of dispersed habitat affected.

#### 3.2.2.4.4.3 Fisheries Resources

Baseline Future - No Action Alternative. There are no unique or sensitive aquatic habitats known to occur within the Area of Concentrated Study; therefore, no significant impacts are anticipated as a result of the No Action Alternative.

**Proposed Action.** There are no unique or sensitive aquatic habitats known to occur within the **Area of Concentrated Study.**

#### **3.2.2.4.5      Threatened and Endangered Species**

Potential impacts to threatened and endangered species are considered significant because of their special legal status. Impacts to other species listed as rare, threatened, endangered, or status undetermined by state agencies are also considered to be significant.

##### **3.2.2.4.5.1      Vegetation**

**Baseline Future – No Action Alternative.** Past and current trends in human population-related impacts on the native vegetation supporting rare, threatened, and endangered plant resources will be expected to continue and be a representative projection of future baseline. In many cases, native vegetation communities that support such species continue to be impacted by human demands such as grazing, agriculture, and other land use developments. Quantity and quality of the native vegetation continues to decline. The rates of change are dependent on management agency and public perceptions of value, usefulness, and/or extent of the resource and the legal status of the habitat. Under normal conditions, populations vary in size over time due to natural successional changes, unpredictable weather, wild fire, and floods. Future baseline is expected to continue with the same type of vegetation changes brought about by urban and agricultural land use and wildlife habitat and recreation management policies that influence threatened and endangered plants or their habitat at present. Therefore, the existing conditions are assumed to reflect the general conditions for the future with the expectation that there will be increasing land use and recreational pressures on the survival of the species.

**Proposed Action.** Analysis of impacts on threatened, endangered, and rare plant species is based on future baseline conditions. No known individuals or populations of federally listed threatened or endangered plant species will be adversely affected due to construction on proposed defense access roads and overpass modifications outside of F.E. Warren AFB. The rare (Wyoming) woolly milkvetch may be impacted at Silo P2 during construction activities. This species was identified within a few meters of the security fence at Silo P2 during a July 1983 field reconnaissance. Impacts to the woolly milkvetch at this silo may be short and long term, significant, and moderate. Similar impacts may affect this species within Cable Path SB1 where it has been observed and along other cable paths if it occurs there. No federal threatened or endangered plant species are known to occur within the 11 proposed cable path alternatives.

The federally listed Category One Colorado butterfly plant and its critical habitat may be impacted at F.E. Warren AFB primarily due to transportation and utility corridors crossing riparian vegetation associated with Crow and Diamond creeks, in addition to the unnamed drainage near the intersection of Cheyenne Road and Parade Avenue. With implementation of appropriate assumed mitigations, any short or long-term impacts to the population or habitat of the Colorado butterfly plant will be significant and moderate. The implementation of the Colorado butterfly plant biological study plan, to be developed as part of the Endangered Species Act, Section 7 consultation process, will provide the benefit of increased knowledge about the plant's ecology and biological functions. Such a study will help identify the potential for transplanting, or reestablishing, and managing populations in appropriate habitat with a higher likelihood of success than might otherwise be possible.

With implementation of assumed mitigations, the three alternative new road configurations (the Proposed Action – R2, R1, and R3) will result in moderate, short and long-term significant impacts to the Colorado butterfly plant population within the base. The offbase circulation

components of R1, R2, and R3 at the Interstates 25 and 80 interchanges and along Round Top Road south of the F.E. Warren AFB boundary will not affect the Colorado butterfly plant. Portions of the R2 and R3 alternatives along the north/south alignments will cross Colorado butterfly plant habitat onbase at Crow and Diamond creeks. Alternative R2 also crosses an unnamed drainage south of the Weapons Storage Area that supports the Colorado butterfly plant. With implementation of appropriate assumed mitigations, proposed new bridge construction at the onbase Crow Creek site and culvert upgrade at the onbase Ninth Street and Diamond Creek site will result in significant, moderate, short and long-term impacts. However, high, short and long-term significant impacts will occur if the offbase Round Top Road design option to Alternatives R2 and R3 is utilized. Extensive roadwork is required on Round Top Road to 1) provide a temporary structure to maintain traffic over Crow Creek, 2) remove the existing timber trestle bridge, and 3) replace the bridge with a single-span structure. In addition, a culvert extension and road widening will be required at the Diamond Creek crossing of the design option.

Portions of the R1 and R2 alternatives along the southern roadway alignments will cross Colorado butterfly plant habitat in an unnamed drainage at Cheyenne Road and Parade Avenue. Proposed road widening and culvert extension at this site will result in moderate, significant, short and long-term impacts. Further east along the southern alignment, moderate, significant, short and long-term impacts to Colorado butterfly plant habitat will also result from bridge construction across Crow Creek near base Gate No. 2. The impact levels for alignment R1, while moderate, are somewhat lower than R2 and R3 because it does not cross Crow and Diamond creeks near the Colorado butterfly plant population. However, impacts to the Colorado butterfly plant will be negligible if the design option to Alternative R1 is selected.

Impacts at aggregate quarries may vary, depending upon the occurrence of threatened and endangered plant species in or adjacent to quarry sites. No federal threatened or endangered plant species presently are known to occur within the dispatch station alternatives.

Overall impact levels for threatened and endangered plant species will be short and long term, moderate and significant in the Flights and F.E. Warren AFB within the Area of Concentrated Study due to construction-related habitat disturbances and loss.

#### 3.2.2.4.5.2 Wildlife

Baseline Future - No Action Alternative. Threatened and endangered wildlife resources, under normal conditions tend to vary in population size over time (and location) due to range or habitat condition, unpredictable weather conditions, disease, and annual hunting and trapping pressures. Human population related pressures have caused threatened and endangered population (species) to come under some degree of direct or indirect human management. Management agencies' goals are to maintain these populations in an approximate equilibrium with the available habitat that can support them. These management goals may include just permit preservation of the species. Habitat (vegetation) restoration and/or preservation of specific habitat types that are important or critical to the species survival. Trends in population size for the most actively managed species will vary depending on the agency perception of the need to increase, decrease, or maintain a specific population. These perceptions and goals can and do vary over time because of public and private agency concerns, pressures, and/or perceptions of value, usefulness, and/or extent of the resource. Therefore, the existing conditions are assumed to reflect the general conditions for the future with the expectation that there will be increasing land use and recreational pressures.



**Proposed Action.** Analysis of impacts on threatened and endangered and rare wildlife species is based on future baseline conditions. The bald eagle may potentially experience short-term, significant, low impacts from increased random shooting throughout the Region of Influence and Area of Concentrated Study. The impact will be highest during peak construction activity and decrease in the years following.

Direct impacts occurring within the Area of Concentrated Study, including F.E. Warren AFB, and other disturbed areas will be associated with habitat loss. With implementation of appropriate assumed mitigations, impacts to the black-footed ferret will be negligible if this species is currently using any of the prairie dog towns that may occur in the Flight portion of the Area of Concentrated Study. The bald eagle, peregrine falcon, and whooping crane will not be significantly impacted. Construction activity may impact several species of special state concern in the Flight portion of the Area of Concentrated Study and on F.E. Warren AFB, such as the swift fox, burrowing owl, pale milk snake, and meadow jumping mouse. These impacts will be low, short term, and significant. Impacts associated with the proposed road configurations, R1, R2, and R3 on F.E. Warren AFB are expected to be negligible.

If habitat of threatened or endangered species occurs in the areas where aggregate quarries are to be expanded the impact will be short term, significant, and moderate; however, if such habitat is not present the impacts would be negligible. With implementation of appropriate mitigations during planning and installation of communication cables, impacts on the black-footed ferret would be negligible. Impacts on other species of state concern will be low, short term, and significant if they are present in the cable paths. Impacts associated with the dispatch station alternatives are expected to be negligible. Negligible impacts to threatened and endangered species will result from overpass modifications.

Overall impact levels for threatened and endangered wildlife species are anticipated to be short term, significant, and low level in the Flight Areas, F.E. Warren AFB, and the Region of Influence due to project-related habitat loss, construction activity disturbances, and random shooting.

#### 3.2.2.4.5.3 Fisheries Resources

**Baseline Future - No Action Alternative.** Threatened and endangered fisheries resources, under normal conditions tend to vary in population size over time and location due to habitat condition, unpredictable changes in stream flow, disease, and annual fishing pressures. Human population related pressures have caused many threatened and endangered fish species to come under some degree of direct or indirect human management. Management agencies' goals are to maintain these populations in an approximate equilibrium with the available habitat that can support them. These goals may permit preservation of the species by restriction of annual take. Management goals may also include habitat restoration, improvement measures, and preservation of specific habitat types that are important or critical to the species survival. Trends in population size for the most actively managed species will vary depending on the agency perception of the need to increase, decrease, or maintain a specific population. These perceptions and goals can and do vary over time because of public and private agency concerns, pressures, and/or perceptions of value, usefulness, and/or extent of the resource. Therefore, the existing conditions are assumed to reflect the general conditions for the future with the expectation that there will be increasing land use and recreational pressures.

**Proposed Action.** Analysis of impacts on threatened and endangered and rare fish species is based on future baseline conditions. No direct impacts to threatened and endangered fish in the Region of Influence will result from the Proposed Action. The expected minor increase in fishing pressure in the greenback cutthroat trout habitat is expected to have negligible impacts on the species.

Construction-related impacts from defense access roads and cable path alternatives on the orangethroat darter (undetermined status, Wyoming) such as increased turbidity levels at stream crossings on Lodgepole Creek in the Area of Concentrated Study may be significant, short term, and moderate, if the species has become reestablished from downstream populations. Implementation of the assumed mitigation measures (restriction of vehicle maintenance activities to areas away from stream banks, and the placement of construction lay down areas outside of riparian or other sensitive areas) will prevent petroleum spills within streams. Therefore, impacts are expected to be negligible and not significant. However, in the event of an accidental petroleum spill (motor oil, gasoline, and diesel fuel), impacts due to water quality changes may be short term, low level, and significant. The common shiner (rare status, Wyoming) may also be impacted by construction activities at stream crossings where it occurs within the Area of Concentrated Study. Impacts to the common shiner are expected to be short term, low, and significant because management agency concern is low (WGFD 1983c) and populations appear to be stable.

Construction of any of the proposed road configurations R1, R2, or R3 and other proposed facilities modifications on F.E. Warren AFB may cause increased turbidities in Diamond and Crow creeks. Implementation of the assumed mitigation measures (restriction of vehicle maintenance activities to areas away from stream banks, and the placement of construction lay down areas outside of riparian or other sensitive areas) will prevent petroleum spills within streams. Therefore, impacts are expected to be negligible and not significant. However, in the event of an accidental petroleum spill (motor oil, gasoline, and diesel fuel), impacts due to water quality changes may be short-term, low-level, and significant. These construction activities are expected to have significant, short-term, and low-level impacts on the common shiner, because agency management concern is low (WGFD 1983c) and populations appear to be stable. There are general similarities for biological resource impacts among the road and dispatch station alternatives (Figure 3.0-2). No impacts are expected on fisheries resources due to overpass modifications.

No indirect impacts will occur on fishes in the Area of Concentrated Study.

Overall impact levels for threatened and endangered fish species are expected to be short term, significant, and of moderate level within the Flight Areas for the orangethroat darter due to construction-related disturbances such as increased turbidities and habitat disturbances. Impact levels will be short term, significant and low level on F.E. Warren AFB due to construction-related activities for the common shiner.

### 3.2.2.5 Summary of Impacts

#### 3.2.2.5.1 Explanation of Detailed Impact Matrix

Using input developed from the impact evaluation model, impacts to biological resource components (i.e. species, vegetation types, or habitat types) have been summarized (Figure 3.2.2-1) to present impact levels and significance for the Proposed Action. Site-specific biological impacts occur in two distinct areas within the Area of Concentrated Study, the Flight area, and F.E. Warren AFB. Site-specific areas are the locations within, or adjacent to, the Area of Concentrated Study where impacts due to project activities will take place. Regional impacts indicated in the matrix tables are based on direct or indirect impacts on


LEGEND		ADVERSE IMPACTS	SIGNIFICANT ADVERSE IMPACTS
★ LOW ★ MODERATE ★ HIGH	LOW	○	●
	MODERATE	○	●
	HIGH	○	●
POTENTIAL BENEFICIAL EFFECTS		<input type="checkbox"/>	
★ MEASURE OF THE AMOUNT OF ENVIRONMENTAL CHANGE			

	POTENTIAL BENEFICIAL EFFECTS	* MEASURE OF THE AMOUNT OF ENVIRONMENTAL CHANGE	SHORT TERM				LONG TERM			
			SITE		LOCAL	REGIONAL	SITE		LOCAL	REGIONAL
			FLIGHTS	F. E. WARREN			FLIGHTS	F. E. WARREN		
BIOLOGICAL RESOURCES (SUMMARY)										
VEGETATION										
			•	●		•	• 2	• 1		
			•	●			• 1	• 1		
				●				• 1		
			•				• 1			
			•	●			• 1	• 1		
			•				• 1			
			•				• 1			
WILDLIFE										
			•	•		•	• 2	• 1		
			•	•		•		• 1		
			•			•				
				•				•		
				•				• 1		
			•			•				
			•			•				
						•				
			•	•		•				
			•							
				•						
			•			•				

1 Impacts are those generated by construction activities and having a long duration.

2 Impacts are those generated by construction activities and having a long duration as well as those generated only by operational activities.

**FIGURE 3.2.2-1 BIOLOGICAL RESOURCES SUMMARY IMPACT MATRIX**

LEGEND		ADVERSE IMPACTS	SIGNIFICANT ADVERSE IMPACTS
★ LOW ★ MODERATE ★ HIGH	LOW	○	●
	MODERATE	○	●
	HIGH	○	●
		POTENTIAL BENEFICIAL EFFECTS	
			
★ MEASURE OF THE AMOUNT OF ENVIRONMENTAL CHANGE			

			SHORT TERM				LONG TERM			
			SITE		LOCAL	REGIONAL	SITE		LOCAL	REGIONAL
			FLIGHTS	F.E. WARREN			FLIGHTS	F.E. WARREN		
WILDLIFE (Continued)										
Furbearers, Upland Game and Waterfowl			o	o		o	o	o		
Furbearers Habitat										
Hunting/Trapping Pressure (Furbearers)			o	o		o	o	o		
Poaching (Furbearers)			o			o				
Upland Game Habitat			o	o			o	o		
Hunting Pressure (Upland Game)			o			o				
Poaching (Upland Game)			o			o				
Waterfowl Habitat			o	o			o	o		
Hunting Pressure (Waterfowl)			o							
Poaching (Waterfowl)			o							
Nongame Mammals, Other Birds, Reptiles, and Amphibians										
Nongame Mammal Habitat										
Other Bird Habitat										
Reptile and Amphibian Habitat										
Raptors			●	●		●	2	●		●
Raptor Habitat			●	●			●	●		
Random Raptor Shooting			●			●	●			●
Nesting Activity			●	●		●				

Impacts are those generated by construction activities and having a long duration.

<sup>2</sup>Impacts are those generated by construction activities and having a long duration as well as those generated only by operational activities.

**FIGURE 3.2.2-1 Continued BIOLOGICAL RESOURCES SUMMARY IMPACT MATRIX**

LEGEND		ADVERSE IMPACTS	SIGNIFICANT ADVERSE IMPACTS
LEVEL OF IMPACT *	LOW	○	●
	MODERATE	○	●
	HIGH	○	●
		POTENTIAL BENEFICIAL EFFECTS	
		<div style="border: 1px solid black; width: 50px; height: 30px; margin: 0 auto;"></div>	
* MEASURE OF THE AMOUNT OF ENVIRONMENTAL CHANGE			

			SHORT TERM				LONG TERM			
			SITE		LOCAL	REGIONAL	SITE		LOCAL	REGIONAL
			FLIGHTS	F.E. WARREN			FLIGHTS	F.E. WARREN		
FISHERIES RESOURCES										
	Fisheries Habitat		•	•		•				
	Turbidity		•	•						
	Fishing Pressure		•			•				
UNIQUE AND SENSITIVE HABITATS										
	Vegetation Habitat (Riparian)		●	●			● <sup>1</sup>	● <sup>1</sup>		
	Wildlife Habitat (Critical-Winter-Yearlong-Habitat)		●	●			● <sup>1</sup>	● <sup>1</sup>		
	Fisheries Habitat									
THREATENED AND ENDANGERED SPECIES										
	Plants		●	●		•	● <sup>1</sup>	● <sup>1</sup>		
	Wildlife		•	•		•				
	Fish		●	•						

POTENTIAL BENEFICIAL EFFECTS					
★ MEASURE OF THE AMOUNT OF ENVIRONMENTAL CHANGE					

Impacts are those generated by construction activities and having a long duration.

**FIGURE 3.2.2-1 Continued BIOLOGICAL RESOURCES SUMMARY IMPACT MATRIX**

biological resources that may occur within the broader Region of Influence. There are no biological impacts designated as "local" because the biological impacts are not assessed by city jurisdiction or district boundary. Biological resources include the potentially affected vegetation, wildlife, and aquatic species. Threatened and endangered species are included but because of their special legal status are discussed separately.

Site-specific impact levels differ between the Flight and F.E. Warren AFB portions of the Area of Concentrated Study, with impacts on vegetation generally being higher on F.E. Warren AFB. The impacts in the regional context tend to be lower than site-specific impacts. The alternative cable paths, roads, and dispatch stations exhibit some differences in impact level between biological resource elements, and between different alternatives (Figure 3.0-2). Nine of the 11 cable paths have low to moderate impact levels which are all significant, and 2 of the paths have negligible impacts which are not significant based on general biological criteria. Consideration of threatened and endangered species indicates that with implementation of appropriate assumed mitigations, impacts on black-footed ferret habitat would be negligible. However impacts on other species of state concern will be low, short term, and significant if they are present in the cable paths. There are general similarities for biological resource impacts among the road and dispatch station alternatives.

The impact level for biological resources in the Flight portion of the Area of Concentrated Study, excluding threatened and endangered species, is short term, low, and significant due to disruption of vegetation, fisheries, and wildlife habitat, although there are some site specific significant moderate level impacts on raptors (random shooting) and on unique and sensitive vegetation habitats (riparian). With implementation of the appropriate assumed mitigations, the biological impacts at F.E. Warren AFB are moderate and significant due to disruption and loss of unique vegetation and disruption of raptor nesting for the short term. The overall impact level for the short term for biological resources in the Area of Concentrated Study (site) is moderate due to the weight given to the relatively unique character of the vegetation on F.E. Warren AFB, the impacts to raptors in the Area of Concentrated Study, and impacts to riparian/wetland vegetation in the Flight portion of the Area of Concentrated Study. Within the broader Region of Influence, the impacts are low and significant for the short term, although significant moderate impact levels (recreation pressures and random shooting) are included in the overall impact level.

Threatened and endangered species were not combined into the overall biological summary because of their legal status. Differences in site-specific impact levels within the Area of Concentrated Study (Flights and F.E. Warren AFB) are due to differences in the effectiveness of the implementation of one or more of the assumed mitigations for the black-footed ferret and the Colorado butterfly plant. In addition, impact levels also differ due to the potential presence of various state species of concern.

The summarized impact level for the threatened and endangered species element will be significant and moderate for the Area of Concentrated Study including the Flight portion and the F.E. Warren AFB area over the short and long term. The impacts will be low and significant in the broader Region of Influence for the short term.

#### 3.2.2.5.2 Aggregation of Elements, Impacts, and Significance

For the Proposed Action (Figure 3.0-1) and the alternatives (Figure 3.0-2), there are two separate aggregated levels of impact for biological resources. One composite rating aggregates the level of impact ratings for four of the biological resource elements: vegetation, wildlife, fisheries, and unique and sensitive habitats. A separate composite rating is aggregated for threatened and endangered species, due to the unique legal status of these resources.

The aggregated impact levels for biological resources indicate short and longterm impacts are expected to be moderate and significant on F.E. Warren AFB; low and significant in other portions (Flights) of the Area of Concentrated Study. On a regional basis aggregated impacts would be low and significant in the short term. Overall, long-term regional impacts will be negligible, although raptors will be subjected to low significant impacts (random shootings).

The aggregated impact levels for threatened and endangered species indicate that short-term, moderate, and significant impacts are anticipated in the Flight Areas and on F.E. Warren AFB of the Area of Concentrated Study. Short-term, low, and significant impacts may occur regionally on threatened and endangered species. Long-term impacts are expected to be moderate and significant at the site level.

#### 3.2.2.5.2.1 Biological Resources

Aggregation of impacts took place in two steps. First, levels of impact for the biological resources subelements were aggregated into composite levels of impact for each element. This first level of aggregations was based on an evaluation of the levels of impacts on the subelements and, when appropriate, use of the highest impact level as representative of the impact level for that subelement and for the element. Second, the determination of the overall impact rating for biological resources involved aggregation of the impact ratings for the elements of the resource. The four biological elements were aggregated to the resource level following an evaluation of the potential project effects on these resource elements (vegetation, wildlife, fisheries, and unique and sensitive habitats). The impact evaluations were based on data available for each resource element and its subelements. Within two of the biological resource elements (vegetation and unique and sensitive habitats) moderate, significant (but mitigated) impacts on riparian, meadow, and mixedgrass prairie vegetation on F.E. Warren AFB are important considerations in aggregating impact levels between the two portions of the Area of Concentrated Study. These impacts are weighted higher than the low to moderate level impacts attributed to vegetation, wildlife, fisheries, and unique and sensitive habitats elsewhere in the Area of Concentrated Study because of their unique characteristics.

#### 3.2.2.5.2.2 Threatened and Endangered Species

Determination of the overall impact rating for threatened and endangered species involved aggregation of the impact ratings for the elements of the resource. Threatened and endangered species were left at the resource level and not combined into the biological category for summarization due to their legal status. The aggregated impact levels within threatened and endangered species are based on a similar approach to that described above. In this case residual moderate, significant impacts are related to potential impacts on the Colorado butterfly plant population at F.E. Warren AFB, and potential for similar level impacts on the woolly milkvetch in the Flight portion of the Area of Concentrated Study. The potential for impacts on prairie dog towns (possible black-footed ferret habitat) in other areas of the Area of Concentrated Study will be negligible with the implementation of appropriate assumed mitigation measures.

#### 3.2.2.6 Mitigation Measures

Potential mitigation measures that will be considered are identified below. One, some, or all of the mitigation measures may ultimately be selected. Each measure identifies the recommended timing for implementation, effectiveness, and the party responsible to implement, but not necessarily to pay for, the measure.

- o Scheduling of construction activity to minimize disturbance during raptor nesting periods. Construction activity within the Deployment Area would not take place within 1 mile of an unobstructed, active raptor nest during the nesting season. This mitigation measure may be effective in reducing the level of impact on nesting raptors from significant and moderate to negligible. If selected, implementation of this mitigation plan should occur during the March through July period from 1985 through 1990. The responsible agency for implementing this mitigating measure is the Air Force or appropriate agencies.
- o Scheduling of construction activity to minimize disturbance during pronghorn migration periods. No project-related construction activity would occur at Silos Q-9 and Q-2 and their access roads during the time periods when pronghorn are moving between summer and winter ranges. This mitigation measure will be effective in reducing the potential level of impact along the pronghorn migration route from significant and low to negligible, and if selected, should be implemented during October and November and April to May from 1985 through 1990. The responsible agency for implementing this mitigation measure is the Air Force.
- o Design and construct roads and stream crossings to minimize encroachment into stream channels and adjacent riparian vegetation within the Area of Concentrated Study. This mitigation measure will be effective in minimizing the impact of increased turbidities and potential petroleum spills on the fisheries resources and reducing the impact level on riparian vegetation from significant and moderate to significant and low. If selected, this mitigation measure should be implemented year-round from 1985 to 1990. The responsible agencies for implementing this mitigation measure are the Wyoming Highway Department and Nebraska Department of Roads.
- o Conduct site-specific biological inventories and surveys of culvert upgrade, and other road modification locations wherever these potential actions intersect or parallel sensitive vegetation types within the Area of Concentrated Study. This mitigation measure will be effective in minimizing the disturbance such as minimizing the removal of vegetation associated with construction activities in woodland, shrubland, riparian, and meadow areas, and should be implemented year-round from 1985 to 1990. The responsible agencies for implementing this measure are the Air Force or the appropriate agencies.
- o Schedule the timing of construction on defense access roads and cable path stream crossings to avoid salmonid spawning periods. This mitigation measure will help maintain the self-propagating populations of salmonid species by avoiding construction activities that may cause siltation and/or disruption of redds during spawning periods (December through March and July through August 1985 to 1990). The responsible agency for implementing this mitigation measure is the Air Force or the appropriate state highway department.
- o Increase monitoring and modeling of the Cheyenne wellfield operations and raw water supply in the Crow Creek watershed to better define production capacity. Groundwater model simulation were done for the Crow Creek wellfields and will continue to be refined into 1984. A better understanding of the impact of operations, rehabilitation or relocation of wells, and monitoring would allow the wellfields to be used to meet all project-related water demands in Cheyenne with only low or negligible effects on water resources. It would provide longterm benefit to the Cheyenne area. This mitigation measure will be effective in providing information about groundwater fluctuations and potential habitat modifications



prior to any irreversible commitment of natural resources, and if selected should be implemented as soon as possible, since current levels of information provide an inadequate base for future analysis. The responsible agency for implementing this mitigation measure is the Cheyenne Board of Public Utilities.

- o Institute a conservation area on Air Force fee title land for riparian/wetland habitats. This mitigation measure will be effective in compensating for impacts to other areas on F.E. Warren AFB. The responsible agency for implementing this measure will be the Air Force.
- o Develop a management plan for protection of rare plant species and sensitive habitats on F.E. Warren AFB. This mitigation measure will be effective in maintaining and protecting rare plant species and sensitive habitats. The responsible agency for implementing this measure will be the Air Force.
- o Increase productivity on selected areas of wildlife habitat on F.E. Warren AFB through promotion of range improvement programs. This mitigation measure will be effective in compensating for construction-related impacts to vegetation and wildlife habitat. The responsible agency for implementation of this measure is the Air Force.
- o Implement an environmental awareness program for all project-related employees to educate immigrants about problems associated with poaching, illegal hunting and fishing, vandalism, violation of park regulations, off-road vehicle abuse, etc.

#### 3.2.2.7 Unavoidable Adverse Impacts

Unavoidable adverse impacts due to the proposed project could include:

- o Random (indiscriminate) shooting of raptors;
- o Permanent loss of riparian habitat;
- o Temporary and permanent disturbance to shrubland; and
- o Permanent and temporary disturbance and loss of Colorado butterfly plant habitat along Diamond and Crow creeks.

#### 3.2.2.8 Irreversible and Irretrievable Resource Commitments

Irreversible and irretrievable commitment of resources include:

- o Loss of about 2 acres of critical habitat for the Colorado butterfly plant;
- o Loss of a small amount (< 30 acres) of riparian and meadow vegetation;
- o Loss of a low amount of native grassland; and
- o Loss of about 200 acres of big game habitat (on F.E. Warren AFB).

### **3.2.2.9     The Relationship Between Local Short-Term Use of Man's Environment and Maintenance and Enhancement of Long-Term Productivity**

Short-term uses of the biological components of man's environment include direct construction-related disturbances and direct impacts associated with an increase in population which occurs over a period of less than 5 years. Long-term uses of man's environment include those impacts occurring over a period of more than 5 years, including permanent habitat loss.

The relationship of the Proposed Action and the assumed mitigations to the goal of the National Environmental Policy Act is expressed in terms of a National Environmental Policy Act objective to maintain and enhance the long-term productivity of the biological components of the environment. It is assumed future trends will reflect current conditions with the expectation there will be increasing land use and recreation pressures on the biological systems in the project area. The evaluation of the short-term use of the biological components of the environment, with the implementation of the Proposed Action, and the assumed mitigations, was made with respect to the existing biological environment, and long-term environmental trends within the Region of Influence. Implementation of the assumed mitigations on short-term impacts will lead to maintenance of long-term productivity for most biological resources.

Short-term uses would create an environmental trade off situation with respect to long-term productivity of some biological resources. The main trade off involves the use of some Colorado butterfly plant habitat and the loss of some individuals of this species due to road construction and upgrade on F.E. Warren AFB. Through implementation of assumed mitigations, the direct impact (loss of habitat and individuals) on the Colorado butterfly plant will be minimized, and the long-term maintenance and enhancement of the onbase population, and perhaps the enhancement (through transplanting) of offbase populations, is provided for as well.

Other short-term uses of the biological environment will be related to construction/modification activities but with implementation of the appropriate assumed mitigations, long-term productivity will be maintained.

### **3.2.3      Geologic Resources**

#### **3.2.3.1      Introduction**

The Region of Influence for geologic resources was presented and justified in Section 2.2.3.1. Following detailed data analysis, the only specific Areas of Concentrated Study are for faulting and soil resources. The Area of Concentrated Study for faulting is the area around the Wheatland-Whalen Fault System. This Area of Concentrated Study is adopted because of the assumed potential for ground rupture within the fault system. Fault rupture represents an impact on the project by the resource and not an impact on the resource produced by the project, and therefore presents a safety issue which is discussed in Section 1.6.10.4.3. Only one subelement of energy and mineral resources, aggregate resources, is impacted by the project and is therefore the only subelement for which levels of impact and significance criteria were developed. The Areas of Concentrated Study for soil resources are adopted primarily because construction sites and approximate buried cable locations have already been established and any project effects on soil resources are limited to site-specific locations (Areas of Concentrated Study) directly disturbed by the Peacekeeper in Minuteman Silos project.

The information in this section is based upon data and detailed analysis contained in the Geologic Resources Environmental Planning Technical Report.

#### **3.2.3.2      Definition of Levels of Impact**

##### **3.2.3.2.1      Energy and Mineral Resources - Aggregate**

The level of impact definitions are based on the total estimated reserves within and adjacent to the Region of Influence. Aggregate is also assessed by production capacity and capacity utilization within the region in Section 3.1.4, construction resources, in the socioeconomic section of the FEIS. The levels of impact are:

- o Negligible Impact - Project demand will be less than 1 percent of estimated reserves.
- o Low Impact - Project demand will be between 1 and 10 percent of estimated reserves.
- o Moderate Impact - Project demand will be between 11 and 20 percent of estimated reserves.
- o High Impact - Project demand will be greater than 20 percent of estimated reserves.

##### **3.2.3.2.2      Soil Resources**

The level of impact definitions for soils are:

- o Negligible Impact - The project will induce erosion at an undetectable rate.
- o Low Impact - The project will induce erosion at a rate less than the soil formation rate.
- o Moderate Impact - The project will induce erosion at a rate approximately equal to the soil formation rate.

- o High Impact - The project will induce erosion at a rate greater than the soil formation rate.

### **3.2.3.3 Determination of Significance Criteria**

#### **3.2.3.3.1 Energy and Mineral Resources**

For the level of impact on aggregate resources to be considered significant, there must be a depletion in the regional resource availability that will result in a long duration decrease in revenue to the regional economy.

#### **3.2.3.3.2 Soil Resources**

The significance criteria for soil resources is based on a comparison of the rate of soil erosion to the rate of soil formation within the site-specific construction areas of the Region of Influence. The impact to soil resources is considered significant when the rate of soil erosion is greater than the rate of soil formation.

### **3.2.3.4 Assumptions, Assumed Mitigations, and Environmental Impacts of the Proposed Action and Project Alternatives**

Based on a detailed environmental data analysis, the following geologic resources are considered issues for impact discussion: energy and mineral resources (aggregate resources), and soil resources (potential wind and water erosion).

Assumptions. For aggregate resources, it was assumed that aggregate supplies would be located within or immediately adjacent to the Region of Influence. This assumption is justified by the large natural deposits of the resource within this area which are close enough to be economically available.

In the evaluation of wind and water erosion potential, several assumptions were necessary.

Assumed Mitigations. The assumed mitigations presented in this section are used to minimize project impacts and are included in the impact analysis. Assumed mitigation measures for the geologic resource impacts include:

- o Aggregate - No assumed mitigations are suggested for aggregate resources.
- o Soil resources - The assumed mitigations consist primarily of procedures normally employed during the construction phase of a large project, in this case, to Defense Access Road and cable route construction activities and to any project-induced ground disturbance in the Deployment Area and on F.E. Warren AFB.
  - 1) Strip and stockpile topsoil in areas requiring grading, other than for permanent construction, and in areas where excavated materials will be disposed, and then replace the topsoil when grading or disposal is complete.
  - 2) Recrop or revegetate disturbed areas as soon as possible.
  - 3) Utilize properly designed erosion control practices that meet state regulations, such as mulching, in any areas required to be left disturbed for extended periods of time.

- 4) Avoid locating cable routes across steep terrain (>6%). Where unavoidable, minimize the number of steep, long (>200 feet) segments oriented perpendicular to the slope.
- 5) Where possible, avoid soils that may be highly sensitive to project activity (tolerable soil losses less than 4 T/acre/yr). Consult with local Soil Conservation Service (SCS) soil scientists prior to final selection of the cable route within the 1-mile corridor.
- 6) Sequence construction of Defense Access Roads and cable routes where practical, to minimize large continuously disturbed areas, especially those oriented parallel to the prevailing winds.
- 7) Following construction, protect areas until new cover is well established, or the site returned to desired use.

Environmental Impacts. Environmental impacts of the Proposed Action and project alternatives are discussed in the following subsections.

#### 3.2.3.4.1 Energy and Mineral Resources

##### 3.2.3.4.1.1 Baseline Future - No Action Alternative

For aggregate resources, anticipated future trends without the project will reflect historic response to market demands. A normal economic growth will result in continued low level use for aggregate.

##### 3.2.3.4.1.2 Proposed Action

A low, not significant impact at the local level for the short and long term is expected for aggregate resources from the Proposed Action or the project element alternatives. Concrete and road building and maintenance requirements will provide a demand for aggregate. Sufficient quantities of sand and gravel, and crushed rock are available to meet these additional demands on the market.

Preliminary estimates of project aggregate demands, including Defense Access Roads, are about 4.6 million tons or approximately 2.6 million cubic yards (cy). These estimates are adequate to incorporate demands from any project element alternatives. Interviews with aggregate producers have recorded estimates of approximately 175 million tons of known available sand and gravel within the region. Such a demand for aggregate could produce some direct or indirect impacts as production quantities are increased. These impacts will last until the completion of the project and will influence areas within economical haul distances of the project.

The impact to aggregate resources is negligible at the regional level in both the short and long term from the Proposed Action or the project element alternatives. There is no permanent depletion of the regional resource availability that will result in a long-term decrease in revenue to the regional economy and therefore no decreases in revenue to the economy of the Region of Influence.

#### **3.2.3.4.2      Soil Resources**

##### **3.2.3.4.2.1      Baseline Future - No Action Alternative**

The baseline conditions of wind and water soil erosion discussed in Section 2.2.3.2.3 will continue for the foreseeable future.

##### **3.2.3.4.2.2      Proposed Action**

A low impact at the site level is anticipated for potential wind and water erosion from the Proposed Action or the project element alternatives. Depending on the precise locations of road, cable route, and other project-related construction, some areas will be permanently or temporarily disturbed. It is assumed that disturbed areas will be either revegetated, returned to cropland use, or covered by some nonerodible material (i.e., paving, building, etc.). The low impact is expected to last during any construction phase and until the disturbed areas are either revegetated, returned to cropland, or built upon.

The potential erosion due to wind is directly related to the amount of protective cover and the size of the area considered. Most of eastern Laramie County is rangeland where wind erosion is not a serious problem. However, substantial erosion could occur in unprotected areas such as cropland. The soils of western Nebraska along the proposed cable routes are cropped extensively and are more susceptible to wind erosion than those of eastern Laramie County. Areas disturbed within the project area could similarly be subject to substantial erosion at the site level without the mitigation measures assumed in Section 3.2.3.4. Estimated soil losses during project operation in western Nebraska will be about the same as for baseline conditions since disturbed areas are either revegetated or recropped.


Moving water is another force causing soil erosion but is not considered a serious problem in southeastern Wyoming, primarily because of the semiarid climate of the region and its rangeland areas. However, certain unprotected areas, primarily cropland such as in western Nebraska, may be seriously affected by water erosion without the mitigation measures assumed in Section 3.2.3.4. Similarly, disturbed areas within eastern Laramie County and western Nebraska could potentially be seriously affected by water erosion, if not properly protected.

#### **3.2.3.5      Summary of Impacts**

##### **3.2.3.5.1      Explanation of Detailed Impact Matrix**

Aggregate resources are termed a low impact at the local level and negligible at the regional level. Estimates have shown there are more than adequate reserves of aggregate within the region to satisfy project demands.

Project impacts on soil resources are considered site-specific, low, and not significant as potential erosion could occur during project construction activities but will be minimal if assumed construction practices (Section 3.2.3.4) are observed. Assuming that the disturbed areas are revegetated or recropped, no long-term consequences will result. Figure 3.2.3-1 shows levels of impact for geologic resources.

LEGEND		ADVERSE IMPACTS	SIGNIFICANT ADVERSE IMPACTS	PROJECT IMPACTS					
LEVEL OF IMPACT *	LOW	○	●	SHORT TERM			LONG TERM		
	MODERATE	○	●	SITE	LOCAL	REGIONAL	SITE	LOCAL	REGIONAL
	HIGH	○	●						
POTENTIAL BENEFICIAL EFFECTS									
★ MEASURE OF THE AMOUNT OF ENVIRONMENTAL CHANGE									
GEOLOGICAL RESOURCES				○	○			○	
Energy and Mineral					○			○	
Aggregate					○			○	
Soil Resources				○					

Note: elements and subelements of geologic resources (e.g., geologic hazards and landslides) not identified on this summary matrix have no project-induced impacts in either the short or long term.

FIGURE 3.2.3-1 GEOLOGIC RESOURCES SUMMARY  
IMPACT MATRIX

#### **3.2.3.5.2      Aggregation of Elements, Impacts, and Significance**

The overall impacts for geologic resources presented in Figure 3.2.3-1 are low and not significant at the site and local levels in the short term, and low and not significant at the local level in the long term. All other impacts, regional short term, and site and regional long term, are negligible and not significant.

These overall impacts have been developed through the following combinations of element and subelement impacts (Figure 3.2.3-1). No impacts were identified for the subelements of geologic hazards. Only one subelement of energy and mineral resources, aggregate resources, was impacted by the project. Therefore, the level of impact for the subelement (aggregate resources) was directly assigned to the element level. Soil resources were only evaluated at the element level.

Each area of consideration for level of impact, site, local, and regional, has only one assigned impact: soil resources at the site level, and energy and mineral resources at the local level. Therefore, the level of impact of the applicable element was directly assigned to the overall resource. Because there is only one level of impact for each overall impact area, aggregation was not necessary.

#### **3.2.3.6      Mitigation Measures**

Two potential mitigation measures will be considered for geologic resources. The first measure concerns aggregate resources, and identifies the party responsible to implement, but not necessarily to pay for, the measure. To minimize visual impacts from aggregate pits located on ridge areas, it is recommended that, prior to determination of final aggregate source locations by subcontractors, an evaluation of all available sources within a similar economic haul distance should be made and topographically high (ridge-forming) deposits should be avoided where possible. The second measure concerns soil resources. The Air Force is considering an Agricultural Monitoring Program that includes the monitoring of soil erosion in agricultural/undeveloped areas subject to Air Force contracted construction.

#### **3.2.3.7      Unavoidable Adverse Impacts**

No significant unavoidable adverse impacts are anticipated to geologic resources from the implementation of the project.

#### **3.2.3.8      Irreversible and Irretrievable Resource Commitments**

Aggregate is a nonrenewable resource and, therefore, its use for this project would result in an irreversible and irretrievable commitment of 4.6 million tons of the resource.

#### **3.2.3.9      The Relationship Between Local Short-Term Use of Man's Environment and Maintenance and Enhancement of Long-Term Productivity**

Potential effects on geologic resources would be short and long term with the demand for aggregate and soil erosion associated with the construction phase of the project. The continued use of aggregate for road maintenance throughout the operational (long-term) phase of the project should enhance average demands on the regional suppliers in a positive manner. No known geologic hazards would be accelerated either in the short or long term.



### **3.2.4      Noise**

#### **3.2.4.1    Introduction**

For the Area of Concentrated Study determination, F.E. Warren AFB was included because of the proposed construction activity onbase. Portions of Cheyenne, Wyoming are potential sites for project-related (induced-residential development) construction activity. Cheyenne is also the location of several major roadway arterials, the airport, and the railroad station. Kimball, Nebraska and Wheatland, Wyoming were included since they represent the largest project-related increase in vehicular operation outside of the Cheyenne area. Additionally, Kimball is also a potential dispatch station site. Chugwater, Wyoming was included since it is a potential site for a dispatch station. Other roadways within the project area which are predicted to convey personnel to the various Launch Facilities were included since potential increases in vehicular operation may result in additional noise effects.

The information in this section is based upon data and detailed analysis contained in the Noise Environmental Planning Technical Report.

#### **3.2.4.2    Definition of Levels of Impacts**

A noise effect due to project-related increases in vehicular, air traffic, railroad, or construction activity (individually or in combination) will be classified as having a negligible, low, moderate, or high impact depending upon the magnitude and/or duration of that effect upon the existing ambient noise environment, relative to the local population and/or land use. Noise impacts are confined to the local vicinity of the noise sources.

The following levels of impact will be used in the analysis:

- o Negligible Impact - Predicted noise impacts will not exceed ambient noise levels by more than 2.9 decibels weighted on the A-scale (dBA). The increase is perceived as barely noticeable.
- o Low Impact - Predicted noise impacts will exceed ambient noise levels by 3 to 4.9 dBA. The increase is perceived as generally noticeable.
- o Moderate Impact - Predicted noise impacts will exceed ambient noise levels by 5 to 9.9 dBA. The increase is perceived as clearly noticeable.
- o High Impact - Predicted noise impacts will exceed ambient noise levels by 10 dBA or more. The increase is perceived as doubling of the noise level.

#### **3.2.4.3    Determination of Significance Criteria**

For the noise level analysis, an increase in noise will be considered significant if any of the following conditions occur for an extended period of time:

- 1) An increase in noise levels of 10 dBA if the existing noise levels are below 55 dBA (creates a potential significant nuisance effect);
- 2) An increase in noise levels that causes an exceedance of noise level standards if the existing noise levels are between 55 and 60 dBA (violates existing regulatory requirement); or

- 3) An increase in noise levels of 5 dBA if the existing noise levels are above 60 dBA (violates or worsens an existing regulatory requirement).

For vehicular traffic, a noise level of 65  $L_{eq}$  (Federal Highway Administration) will be used. For railroad and aircraft operations, an  $L_{dn}$  (FAA, EPA) of 65 will be used. For construction activity, applicable federal, state, and/or local standards, criteria, or ordinances will be applied. The  $L_{dn}$  and  $L_{eq}$  measures are expressed on the dBA sound level scale. For purposes of comparing noise level indices the  $L_{eq}$  (for the peak-traffic period) is approximately equivalent to the  $L_{dn}$ .

#### 3.2.4.4 Assumptions, Assumed Mitigations, and Environmental Impacts of the Proposed Action and Project Alternatives

As with the assessment of existing conditions, the Federal Highway Administration STAMINA 2.0 model was used to determine vehicular noise levels for 1985 and 1990 for the No Action Alternative and the Proposed Action. Traffic volume projections for these future years were supplied by the transportation task group in the form of peak-hour volumes.

The vehicular noise assessment was performed for those roadway segments in Cheyenne that were anticipated to convey increased traffic volumes as a result of implementing the project. The selection of these roadways was coordinated with the transportation task group and reflects any concerns voiced by state and local agencies and the public. The two major arterials in Kimball, U.S. 30 and Route 71, and in Wheatland, 16th Street and South Street, were evaluated as worst-case noise assessments for the non-Cheyenne project area.

For air traffic noise, the Federal Aviation Administration (FAA) airport noise exposure contouring procedure, as discussed in Section 2.2.4.1.3, was also used for evaluation of future  $L_{dn}$  noise levels associated with the Cheyenne Airport in 1985 and 1990 for the No Action Alternative and Proposed Action. Predictions of future airport operations were developed by the transportation task group.

For railroad noise, the Wyle Laboratories procedure, as discussed in Section 2.2.4.1.3, was also used for evaluation of future  $L_{dn}$  noise levels associated with Cheyenne's railroad station.

Standard references were reviewed to define noise levels generated by various types of construction activities and construction equipment.

Assumptions. The vehicular noise assessment assumed that roadways, exclusive of Interstates 25 and 80 which operated at posted limits, operated at a minimum of 30 miles per hour (mph) during the peak-hour period. This speed limit is the lowest threshold for which STAMINA 2.0 can predict associated noise levels. It represents a conservative estimate for worst-case noise analysis since lower assumed speeds would result in correspondingly lower noise level predictions. For purposes of determining impacts of noise levels, the roadway right-of-way was assumed to define the beginning of the receptor (residential) property line.

Construction equipment was assumed to be operating with baffles and mufflers.

Assumed Mitigations. No assumed mitigations were included as part of this assessment. (This is equivalent to performing a conservative impact analysis.)

Environmental Impacts. Environmental impacts of the Proposed Action and project alternatives are discussed in the following subsections for the short term, 1985 (peak year of construction) and long term, 1990 (beginning year of operations).

#### 3.2.4.4.1 Vehicular Noise

##### 3.2.4.4.1.1 Baseline Future - No Action Alternative

The results of the STAMINA 2.0 noise analysis for the No Action Alternative are shown in Table 3.2.4-1. This table presents  $L_{eq}$  noise levels predicted to the roadway right-of-way and beyond in 100-foot increments. All levels were predicted to be below 65.0 dBA within 200 feet of the right-of-way. As noted previously, the roadway right-of-way was assumed to represent the residential property line.

In 1985, the 65- $L_{eq}$  noise level is predicted to be exceeded at the right-of-way boundary along segments of Interstate 25, Prairie Avenue, Central Avenue, Pershing Boulevard, College Drive, Windmill Road, and Evans Avenue in Cheyenne; U.S. 30 in Kimball; and 16th Street and South Street in Wheatland. In 1990, the 65- $L_{eq}$  noise level will be exceeded along the above segments as well as additional roadway segments along Dell Range Boulevard, Ridge Road, and Lincolnway in Cheyenne; and Route 71 in Kimball.

The maximum noise levels predicted in 1985 and 1990 were 68.9 dBA and 70.5 dBA respectively, in Cheyenne along Interstate 25; and 71.0 dBA and 71.4 dBA, respectively, in Wheatland along South Street. The analysis also indicated that approximately 37 dwelling units with an estimated population of 93 people will lie within the calculated 65- $L_{eq}$  noise contour which extends beyond the right-of-way along Interstate 25 in Cheyenne in 1985 and 1990. In Kimball, approximately 36 dwelling units with an estimated population of 90 people will lie within the 65- $L_{eq}$  contour in 1985 and 1990; and in Wheatland, approximately 100 dwelling units with an estimated population of 250 people will lie within the 65- $L_{eq}$  contour for both 1985 and 1990.

##### 3.2.4.4.1.2 Proposed Action

The results of the STAMINA 2.0 noise analysis for the Proposed Action are also shown in Table 3.2.4-1. For 1985 (short term), the Proposed Action was predicted to result in a negligible, not significant impact of vehicular noise. The maximum predicted increase in noise levels was along Dell Range Boulevard (between Prairie Avenue and Powder House Road) with an increase in the  $L_{eq}$  noise level of 2.0 dBA. The predicted long-term (1990) noise levels for the Proposed Action are identical with those predicted for the No Action Alternative.

In 1985 in Cheyenne, the 65- $L_{eq}$  noise level contour associated with the Proposed Action will encompass an additional 27 dwelling units along Interstate 25 (between Four Mile Road and Central Avenue) with an estimated population of 68 people; and 5 dwelling units along Pershing Boulevard (between Morrie Avenue and Logan Avenue) with an estimated population of 13 people when compared to the No Action Alternative. In Wheatland the project will result in an additional 8 dwelling units along South Street with an estimated population of 20 people within the 65- $L_{eq}$  noise level contour. There will be no additional short-term (1985) or long-term (1990) impacts on dwelling units (population) when compared to the No Action Alternative. No cumulative noise effects between roadways and other noise sources (i.e., railroad or airport) are predicted. In addition no effects on land use adjacent to the roadways are anticipated.

The use of dispatch stations will result in increased construction personnel-related vehicular trips to and from the station site and along affected roadways. Noise increases relating to the use of these stations will, however, be negligible and not significant.

Table 3.2.4-1

PREDICTED NOISE LEVELS AT SELECTED RECEPTORS  
1985 AND 1990

Roadway Segments	Year	Project Option	Right- of-Way (L <sub>eq</sub> )	Difference Between Proposed Action and No Action	Distance From	
					Right-of-Way Line 100 Ft (L <sub>eq</sub> )	200 Ft (L <sub>eq</sub> )
Cheyenne, Wyoming						
Interstate 25 (Four Mile Road to Central Ave.)	1985	No Action	66.6		63.4	61.2
	1985	Proposed Action	67.1	0.5	63.9	61.7
	1990	No Action/ Proposed Action	68.0		64.7	62.6
Interstate 25 (Central Ave. to Pershing Blvd.)	1985	No Action	68.9		65.7	63.6
	1985	Proposed Action	69.2	0.3	66.1	64.0
	1990	No Action/ Proposed Action	70.5		67.3	65.1
Interstate 25 (Pershing Blvd. to Missile Drive)	1985	No Action	68.9		65.7	63.6
	1985	Proposed Action	69.1	0.2	66.1	63.9
	1990	No Action/ Proposed Action	70.2		67.0	64.8
Interstate 25 (Missile Drive to U.S. 30)	1985	No Action	67.7		64.5	62.4
	1985	Proposed Action	68.1	0.4	64.9	62.8
	1990	No Action/ Proposed Action	69.3		66.1	63.9
Prairie Avenue (Yellowstone Road to Dell Range Blvd.)	1985	No Action	66.8		58.3	54.7
	1985	Proposed Action	67.3	0.5	58.9	55.2
	1990	No Action/ Proposed Action	67.7		59.3	55.6

Table 3.2.4-1 Continued, page 2 of 5  
PREDICTED NOISE LEVELS AT SELECTED RECEPTORS

Roadway Segments	Year	Project Option	Right- of-Way (Leq)	Difference Between Proposed Action and No Action	Distance From	
					Right-of-Way Line 100 Ft (Leq)	200 Ft (Leq)
Dell Range Boulevard (Prairie Ave. to Powder House Road)	1985	No Action	63.5		57.6	54.7
	1985	Proposed Action	65.5	2.0	58.4	55.1
	1990	No Action/ Proposed Action	65.9		58.8	55.5
Central Ave. (Interstate 25 to Yellowstone Road)	1985	No Action	65.6		58.3	54.8
	1985	Proposed Action	66.5	0.9	59.2	55.7
	1990	No Action/ Proposed Action	66.5		59.2	55.7
Central Ave. (Yellowstone Road to Warren Ave.)	1985	No Action	67.1		59.8	56.3
	1985	Proposed Action	67.5	0.4	60.2	56.7
	1990	No Action/ Proposed Action	67.6		60.3	56.8
Pershing Blvd. (Central Ave. to Warren Ave.)	1985	No Action	64.8		57.5	54.0
	1985	Proposed Action	65.3	0.5	58.0	54.5
	1990	No Action/ Proposed Action	65.9		58.6	55.1
Pershing Blvd. (Evans Ave. to Morrie Ave.)	1985	No Action	67.0		59.8	56.3
	1985	Proposed Action	67.4	0.4	60.2	56.7
	1990	No Action/ Proposed Action	67.9		60.7	57.2
Pershing Blvd. (Morrie Ave. to Logan Ave.)	1985	No Action	66.7		59.5	56.0
	1985	Proposed Action	67.3	0.6	60.0	56.5
	1990	No Action/ Proposed Action	67.7		60.5	57.0

Table 3.2.4-1 Continued, page 3 of 5  
PREDICTED NOISE LEVELS AT SELECTED RECEPTORS

Roadway Segments	Year	Project Option	Right- of-Way (Leq)	Difference Between Proposed Action and No Action	Distance From	
					Right-of-Way Line 100 Ft (Leq)	200 Ft (Leq)
Pershing Blvd. (Logan Ave. to Converse Ave.)	1985	No Action	65.6	1.1	58.4	54.9
	1985	Proposed Action	66.7		59.5	56.0
	1990	No Action/ Proposed Action	66.9		59.7	56.2
Pershing Blvd. (Converse Ave. to Windmill Road)	1985	No Action	66.2	0.7	59.0	55.5
	1985	Proposed Action	66.9		59.6	56.1
	1990	No Action/ Proposed Action	66.4		59.1	55.6
Pershing Blvd. (Ridge Road to U.S. 30)	1985	No Action	62.9	0.7	55.7	52.2
	1985	Proposed Action	63.6		56.4	52.9
	1990	No Action/ Proposed Action	65.2		58.0	54.5
College Drive (Parsley Blvd. to Walterscheid Blvd.)	1985	No Action	65.1	0.7	57.9	54.4
	1985	Proposed Action	65.8		58.5	55.0
	1990	No Action/ Proposed Action	66.8		59.6	56.1
Windmill Road (Dell Range Blvd. to Pershing Blvd.)	1985	No Action	65.8	0.7	58.6	55.1
	1985	Proposed Action	66.5		59.3	55.8
	1990	No Action/ Proposed Action	66.1		58.8	55.3
Ridge Road (Four Mile Road to Dell Range Blvd.)	1985	No Action	64.8	0.3	57.6	54.1
	1985	Proposed Action	65.1		57.9	54.4
	1990	No Action/ Proposed Action	65.5		58.3	54.8

Table 3.2.4-1 Continued, page 4 of 5  
PREDICTED NOISE LEVELS AT SELECTED RECEPTORS

Roadway Segments	Year	Project Option	Right- of-Way (L <sub>eq</sub> )	Difference Between Proposed Action and No Action	Distance From	
					Right-of-Way Line 100 Ft (L <sub>eq</sub> )	200 Ft (L <sub>eq</sub> )
Lincolnway (Logan Ave. to Morrie Ave.)	1985	No Action	64.4		61.4	59.3
	1985	Proposed Action	64.9		61.9	59.7
	1990	No Action/ Proposed Action	65.4	0.5	62.4	60.2
Evans Avenue (8th Ave. to Pershing Blvd.)	1985	No Action	65.1		57.0	53.7
	1985	Proposed Action	65.5		57.4	54.0
	1990	No Action/ Proposed Action	66.0	0.4	57.9	54.5
Ames Avenue Parsley Blvd. to 20th Street)	1985	No Action	64.5		57.3	53.8
	1985	Proposed Action	65.0		57.8	54.3
	1990	No Action/ Proposed Action	64.7	0.5	57.5	54.0
<u>Kimball, Nebraska</u>						
U.S. 30	1985	No Action	66.9		59.7	56.2
	1986	Proposed Action	68.0		60.7	57.2
	1990	No Action/ Proposed Action	67.4	1.1	60.1	56.6
Route 71	1985	No Action	64.7		57.4	53.9
	1986	Proposed Action	66.3		59.0	55.5
	1990	No Action/ Proposed Action	65.1	1.6	57.8	54.3

Table 3.2.4-1 Continued, page 5 of 5  
PREDICTED NOISE LEVELS AT SELECTED RECEPTORS

Roadway Segments	Year	Project Option	Right- of-Way (Leq)	Difference Between Proposed Action and No Action	Distance From	
					Right-of-Way Line 100 Ft (Leq)	200 Ft (Leq)
<u>Wheatland, Wyoming</u>						
16th Street	1985	No Action	69.7		62.4	58.9
	1986	Proposed Action	70.4	0.7	63.1	59.6
	1990	No Action/ Proposed Action	70.0		62.7	59.2
South Street	1985	No Action	71.0		63.7	60.2
	1986	Proposed Action	71.6	0.6	64.3	60.8
	1990	No Action/ Proposed Action	71.4		64.0	60.6



Because of the minimal increases in traffic volumes associated with project alternatives, the impact of vehicular noise with respect to construction of any of the alternative road access routes at F.E. Warren AFB, dispatch station alternatives, or cable path alternatives was predicted to be negligible and not significant.

#### 3.2.4.4.2 Air Traffic Noise

##### 3.2.4.4.2.1 Baseline Future - No Action Alternative

The FAA noise contouring procedure bases determination of noise contour configuration on annual air traffic operations. Based on the projected operations for 1985 and 1990,  $L_{dn}$  noise level contours were developed.

Anticipated growth of jet aircraft operations at Cheyenne Airport was projected to be approximately 7 percent per year. Since jet aircraft are the noisiest operation at the airport and, hence, are the controlling factor in the size and configuration of the noise contours, the increase in distribution of quieter turbofan jets would result in a decrease of overall noise levels. The 65- $L_{dn}$  noise contour for 1990 covers a smaller area. However, for a conservative analysis, it is assumed that the 1990 noise contour is the same as that for 1985. The noise contour representing the 65- $L_{dn}$  noise level is presented in Figure 3.2.4-1.

The analysis indicates that about 141 dwelling units (south, east, and northwest of the airport) with an estimated population of 353 people, fall within the calculated 65- $L_{dn}$  noise level contour which extends beyond the airport boundary. The slightly smaller area covered by the 65- $L_{dn}$  contour, when compared to existing conditions, results from a projected decrease in noisier aircraft, i.e., turbojets, among business jet operations.

##### 3.2.4.4.2.2 Proposed Action

The short-term (1985) 65- $L_{dn}$  noise level contour for the Proposed Action is also shown in Figure 3.2.4-1. It is identical to the contour for the 1985 No Action Alternative because the total number of project-generated aircraft operations and existing baseline operations falls within the same range of operations that is representative of the No Action Alternative. The long-term (1990) Proposed Action 65- $L_{dn}$  noise contour is the same as the No Action Alternative contour, as shown in Figure 3.2.4-1, because no project-related air traffic activity is projected for 1990. No effect on land use adjacent to the airport is anticipated. No cumulative noise effects between the airport and area roadways or the railroad station were predicted. The impact is therefore negligible and not significant.

Because of the minimal increases in airport operations associated with project alternatives, the impact of air traffic noise with respect to construction of any of the alternative road access routes at F.E. Warren AFB, dispatch station alternatives, or cable path alternatives was predicted to be negligible and not significant.

#### 3.2.4.4.3 Railroad Noise

##### 3.2.4.4.3.1 Baseline Future - No Action Alternative

The  $L_{dn}$  noise level contours for rail operations in 1985 and 1990 are identical to those projected for the existing conditions due to negligible growth in railroad activity. A total of 61 dwelling units (approximately 153 people) were predicted to fall within the 65- $L_{dn}$  noise level contour which extends beyond the railroad boundary.



#### 3.2.4.4.3.2 Proposed Action

The  $L_{dn}$  railroad noise level contours for the short term (1985) and long term (1990) are identical to those for the 1983 existing conditions. Impacts are therefore predicted to be negligible and not significant. No cumulative noise impacts between the railroad and area roadways or airport operations were predicted.

Because of the minimal increases in railroad operations associated with project alternatives, the impact of railroad noise with respect to construction of any of the alternative road access routes at F.E. Warren AFB, dispatch station alternatives, or cable path alternatives was predicted to be negligible and not significant.

#### 3.2.4.4.4 Construction Noise

##### 3.2.4.4.4.1 Baseline Future - No Action Alternative

Typical ranges of noise levels from general construction activities or construction equipment are not expected to differ from those of existing conditions.

##### 3.2.4.4.4.2 Proposed Action

Noise level increases due to construction are expected to occur within close proximity to project activities. Predicting construction noise for a specific project is difficult because of the variability of several factors, which are critical in estimating construction-related noise but which often cannot be precisely known in advance of the actual work. These factors include the specific types of equipment on the job, the construction methods, and the scheduling of work. These details of the job are not generally specified in the contract documents but are left up to the contractor, thereby giving the contractor flexibility in utilizing equipment and personnel.

Construction activity on F.E. Warren AFB is not anticipated to affect offbase residential land uses since such noise levels attenuate quickly with distance and the nearest residential dwelling is approximately 2,000 feet from any continuous construction noise source on the base.

With respect to grading and construction at the Launch Facilities, assuming bulldozer and dumptruck activity, the  $L_{eq}$  noise levels could be approximately 85.0 at 50 feet but will be expected to attenuate to 61.0 at about 800 feet. This activity will be of short duration.

Current projections indicate that approximately 642 miles of roadway may be upgraded to meet necessary specifications for access to the Deployment Area. Roadway construction activities are presently encompassed by resurfacing Option A, which consists of combining part asphalt and part gravel upgrade for existing gravel Defense Access Roads, and resurfacing Option B, which consists of paving all gravel Defense Access Roads. In addition, where existing bridges pose height or weight restrictions to movement of Launch Facility or construction equipment, raising of bridge heights or lowering of pavement profiles may occur. Noise increases from such construction activities, which primarily involve equipment such as scrapers, graders, rollers, dump trucks and, for bridge work, cranes or derricks, will be of short duration at any given location. No difference in temporary noise increases is anticipated between Options A and B. At sites where paving will occur, the use of a mobile asphalt batching plant may also result in temporary, short-duration noise increases.

The Proposed Action was predicted to result in short-term, negligible, and not significant impacts from construction noise. Long-term impacts will also be negligible and not significant because construction noise will cease when the construction activities end.

Because of the short duration of construction activity at any given location, the impact of construction noise, with respect to any of the alternative road access routes at F.E. Warren AFB, dispatch station alternatives, or cable path alternatives, was predicted to be negligible and not significant.

#### 3.2.4.5 Summary of Impacts

##### 3.2.4.5.1 Explanation of Detailed Impact Matrix

The noise impact matrix presents results of the analyses performed in this study including a summary of the levels of impact and significance determination for each element (Figure 3.2.4-2). The overall aggregated levels of impact and significance determination are also provided in Figure 3.0-1.

Negligible, short-term, not significant, local impacts are predicted for vehicular traffic noise. The impact of increased air traffic due to project activities was determined to be negligible and not significant. Impact from increased railroad activity was determined to be negligible and not significant. Noise impacts from construction activities were also determined to be negligible and not significant. All long-term impacts were determined to be negligible and not significant.

All the alternative road access routes at F.E. Warren AFB, dispatch station alternatives, and cable path alternatives were predicted to result in negligible, not significant impacts.

##### 3.2.4.5.2 Aggregation of Elements, Impacts, and Significance

Figure 3.0-1 presents the aggregation of impacts for all resources, including noise. The aggregated rating of noise for the Proposed Action resulted in negligible short and long-term, not significant, local impacts.

Determination of the overall rating for noise involves aggregation of the impact ratings for the elements (component sources) of noise. The noise sources were evaluated as described in Section 3.2.4.4 and then aggregated to the resource level by giving an equal weighting factor to the impacts. Ambient noise level standards and/or guidelines have been established by various government agencies. These standards and/or guidelines set noise level limits, the exceedance of which may require mitigation to acceptable levels. Vehicular, air traffic, railroad, and construction noise were given an equal weighting factor since these elements are in reality the sources of noise in general. Since noise levels are determined by the cumulative impact of all noise sources, the noise source with the highest impact and significance would influence the overall noise level of impact and significance.

#### 3.2.4.6 Mitigation Measures

Since only negligible, not significant noise impacts have been identified, mitigation measures are not deemed necessary.



#### **3.2.4.7     Unavoidable Adverse Impacts**

No unavoidable adverse short or long-term noise impacts have been identified through the course of this assessment. It should be noted, however, that there does exist potential for short-duration or nuisance impacts resulting from construction activity.

#### **3.2.4.8     Irreversible and Irretrievable Resource Commitments**

Implementation of the Proposed Action would result in no irreversible nor irretrievable resource commitments with respect to noise or noise-related impact areas.

#### **3.2.4.9     The Relationship Between Local Short-Term Use of Man's Environment and Maintenance and Enhancement of Long-Term Productivity**

Implementation of the Proposed Action would result in short duration project-related noise impacts primarily associated with the construction phase of the project. No long-term noise effects are anticipated and, hence, no effect on the maintenance and enhancement of long-term productivity will ensue.

### **3.2.5      Air Quality**

#### **3.2.5.1    Introduction**

With respect to Area of Concentrated Study determination, F.E. Warren AFB was included since it represents a potential pollutant source for fugitive dust emissions associated with onbase construction. Cheyenne was included due to project-related induced residential development as well as increases in transportation pollutant sources. Kimball, Nebraska and Wheatland, Wyoming, were included since they represent the largest project-related increase in vehicular operation outside of the Cheyenne area. Additionally, Kimball is a potential dispatch station site. Chugwater, Wyoming was included since it is a potential location for a dispatch station. Other roadways within the project area which are predicted to convey personnel to the various Launch Facilities were included since potential increases in vehicular operation could result in additional air quality effects. The Area of Concentrated Study also includes those areas where total suspended particulate concentrations exceeded United States Environmental Protection Agency (EPA) minimum threshold values.

The information in this section is based upon data and detailed analysis contained in the Air Quality Environmental Planning Technical Report.

#### **3.2.5.2    Definition of Levels of Impacts**

Effects on air quality and visibility will be classified as having negligible, low, moderate, or high impacts depending upon the general health effects of the pollutants generated by project facilities and/or activities as measured by ground level concentrations and their relationships to applicable ambient air quality standards or criteria. Analysis will include a breakdown of levels of impact both by geographic scale and duration, as appropriate.

##### **3.2.5.2.1    Carbon Monoxide**

The effects of carbon monoxide (CO) will be confined to the local scale due to its rapid dispersion characteristics. The levels of impact for this pollutant are defined as follows:

- o Negligible Impact - Predicted incremental CO concentrations will not equal or exceed EPA minimum threshold levels (500 micrograms per cubic meter [ $\text{ug}/\text{m}^3$ ] or 0.45 parts per million [ppm] over an 8-hour period, or 2,000  $\text{ug}/\text{m}^3$  or 1.8 ppm over a 1-hour period). No general health effects will occur.
- o Low Impact - Predicted incremental CO concentrations will equal or exceed EPA minimum threshold levels, but the concentrations plus background will not exceed 50 percent of the National Ambient Air Quality Standards (5,000  $\text{ug}/\text{m}^3$  or 4.5 ppm over an 8-hour period, or 20,000  $\text{ug}/\text{m}^3$  or 17.5 ppm over a 1-hour period). No general health effects will occur but pollutant concentration increases will be detectable.
- o Moderate Impact - Predicted incremental CO concentrations plus background will exceed 50 percent of the National Ambient Air Quality Standards, but the concentrations plus background will not exceed the National Ambient Air Quality Standards (10,000  $\text{ug}/\text{m}^3$  or 9 ppm over an 8-hour period, or 40,000  $\text{ug}/\text{m}^3$  or 35 ppm over a 1-hour period). No general health effects will occur but pollutant concentrations rise measurably.

- o **High Impact** - Predicted incremental CO concentrations will exceed National Ambient Air Quality Standards (10,000 ug/m<sup>3</sup> or 9 ppm over an 8-hour period, or 40,000 ug/m<sup>3</sup> or 35 ppm over a 1-hour period) when combined with background concentrations. General health effects will include mild aggravation of symptoms in susceptible people and initial symptoms will occur in the healthy population.

#### 3.2.5.2.2 Fugitive Dust

The effects of fugitive dust on the local and regional scale will be classified as follows:

- o **Negligible Impact** - Predicted incremental concentrations of fugitive dust will not equal or exceed EPA minimum total suspended particulate threshold levels (1.0 ug/m<sup>3</sup> averaged annually or 5.0 ug/m<sup>3</sup> over a 24-hour period). No general health effects will occur.
- o **Low Impact** - Predicted incremental concentrations of fugitive dust will exceed minimum EPA total suspended particulate threshold levels, but the increment plus background concentration of total suspended particulates will not exceed Wyoming total suspended particulate Ambient Air Quality Standards of 60 ug/m<sup>3</sup> averaged annually or 150 ug/m<sup>3</sup> over a 24-hour period. No general health effects will occur, but pollutant concentrations will rise measurably.
- o **Moderate Impact** - Predicted incremental concentrations of fugitive dust will exceed minimum EPA total suspended particulate threshold levels and the increment plus background concentration of total suspended particulates will exceed Wyoming total suspended particulate Ambient Air Quality Standards of 60 ug/m<sup>3</sup> averaged annually or 150 ug/m<sup>3</sup> over a 24-hour period but will not exceed the total suspended particulate National Ambient Air Quality Standards of 75 ug/m<sup>3</sup> averaged annually or 260 ug/m<sup>3</sup> over a 24-hour period. The Nebraska Ambient Air Quality Standards for total suspended particulates are the same as the National Ambient Quality Standards. The onset of minor general health effects may appear among susceptible people.
- o **High Impact** - Predicted incremental concentrations of fugitive dust will exceed the total suspended particulate National Ambient Air Quality Standards (75 ug/m<sup>3</sup> averaged annually or 260 ug/m<sup>3</sup> over a 24-hour period) when combined with background concentrations of total suspended particulates. General health effects would begin with mild aggravation of symptoms in susceptible people and symptoms of irritation in the healthy population. As concentrations become higher, general health effects would include major aggravation of symptoms and decreased exercise tolerance in people with heart or lung disease.

#### 3.2.5.2.3 Visibility

The air quality effects on visibility are determined for Class I and Category I areas (regional scale). The level of impairment of visibility as applicable to the project area will be classified as follows:

- o **Negligible Impact** - Predicted levels of visual range will not be less than the existing project area median yearly visual range of 64 miles.
- o **Low Impact** - Predicted levels of median yearly visual range will be between 50.0 to 63.0 miles.



- o Moderate Impact - Predicted levels of median yearly visual range will be between 30.0 to 49.0 miles.
- o High Impact - Predicted levels of median yearly visual range will be less than 30.0 miles.

### 3.2.5.3 Determination of Significance Criteria

For the air quality analysis, an increase in predicted concentration of an individual pollutant when combined with background concentration levels will be significant if it will equal or exceed the applicable ambient air quality standard, thus creating a law violation and potential health hazard. Predicted concentrations plus background measuring less than the applicable ambient air quality standard will be considered not significant. The impact on regional visibility would be considered significant if the predicted median yearly visual range is below 30 miles (creates a potential significant nuisance effect).

### 3.2.5.4 Assumptions, Assumed Mitigations, and Environmental Impacts of the Proposed Action and Project Alternatives

The analytic evaluation concentrated on CO and fugitive dust because these were the only pollutants that are expected to have large increases in emission quantities for the level of activity associated with the project. The increases in sulfur dioxide, nitrogen dioxide, and hydrocarbons from construction activity and vehicular traffic were determined to be much lower than for CO and fugitive dust, and are not expected to approach regulatory values.

The assessment of CO concentrations from vehicular operation in the urbanized project area was undertaken using the computerized Gaussian dispersion model, CALINE 3, in conjunction with vehicular emission factors generated from EPA's computerized MOBILE 2 mobile source emissions model. These models are discussed in Section 2.2.5.1.3.

The assessment was performed for those roadway segments and roadway intersections that were anticipated to convey increased traffic volumes as a result of implementing the project. The selection of these roadways was coordinated with the transportation task group and reflects the concerns voiced by various state and local agencies and the public.

The assessment of fugitive dust concentrations from construction activities at F.E. Warren AFB, the Deployment Area, and in Cheyenne (induced residential housing development) was undertaken using the computerized Industrial Source Complex Model-Short Term (EPA 1979a) for 24-hour impact analysis and the computerized Climatological Dispersion Model-Wyoming (EPA 1973, Wyoming Department of Environmental Quality 1983) for annual assessment. Emission factors for input into these models were developed from AP-42 (EPA 1981b) and Wyoming's Guideline for Fugitive Dust Emission Factors (Wyoming Department of Environmental Quality 1979a). The computerized CRSTER Model (EPA 1977) was used to determine the worst-case meteorological dispersion day for the 24-hour analysis. Surface meteorological data collected at the Cheyenne National Weather Service station, and upper air data collected at the Denver National Weather Service station for the period 1960 to 1964, were used in this analysis.

The EPA Visibility Workbook (EPA 1980b) was used to determine potential regional visibility impairment resulting from project-related increases in fugitive dust (total suspended particulates).

**Assumptions.** Numerous assumptions were employed in conjunction with the various models and/or methodologies used in this assessment. The assumptions were used directly as data inputs to the computer codes or used to develop calculated data inputs. These assumptions can be classified into categories as computer code optional values (these values are built into the programs by the regulatory agency responsible for the code development for use if on-site or real data are unavailable) and climatological data which are assumed to be representative of the study area.

**Assumed Mitigations.** The analyses assumed use of chemical dust palliatives, which are at least 50 percent efficient in curtailing fugitive dust emissions, as a standard engineering and construction mitigation measure.

Emission levels from all construction vehicles were assumed to comply with all federal, state, and local air quality regulations.

**Environmental Impacts.** Environmental impacts of the Proposed Action and project alternatives are discussed in the following subsections for the short term, 1985 (peak year of construction) and long term, 1990 (beginning year of operations). The No Action Alternative assumes no project and is based on anticipated, normal growth within the project area.

#### 3.2.5.4.1 Carbon Monoxide

##### 3.2.5.4.1.1 Baseline Future - No Action Alternative

The results of the CO assessment of the No Action Alternative in 1985 and 1990 are shown in Table 3.2.5-1. The CO concentrations represented in the table include 1 and 8-hour background concentrations of 1.0 ppm and 0.5 ppm, respectively.

The highest concentrations were predicted at intersections since CO emissions increase as vehicular speeds decrease. The intersection of Yellowstone Road and Prairie Avenue was predicted to have the highest CO concentrations in both 1985 and 1990. The predicted 1-hour concentrations in 1985 and 1990 were 27.5 ppm and 24.0 ppm, respectively, while the 8-hour concentrations were 5.4 ppm and 4.9 ppm, respectively. The highest predicted 1-hour concentrations along a roadway segment, Central Avenue in Cheyenne between Interstate 25 and Yellowstone Road, were 8.0 and 7.5 ppm in 1985 and 1990, respectively. Eight-hour concentrations were 2.1 ppm for both 1985 and 1990. All 1 and 8-hour predicted CO concentrations were below applicable ambient air quality standards.

##### 3.2.5.4.1.2 Proposed Action

The results of the CO assessment in 1985 (short term), and 1990 (long term) are shown in Table 3.2.5-1. These values, likewise, include the 1 and 8-hour background CO concentrations.

For the short term (1985), the Proposed Action was predicted to result in low, not significant impacts of CO in Cheyenne, Kimball, and Wheatland. The largest increase in CO was predicted in Cheyenne at the intersection of Pershing Boulevard and Central Avenue which was 5.4 ppm and 0.8 ppm for the 1-hour and 8-hour periods, respectively, as compared to the No Action Alternative. For roadway segments, the largest increase in CO was predicted along Central Avenue in Cheyenne between Interstate 25 and Yellowstone Road. This increase was 1.6 ppm and 0.4 ppm for the 1-hour and 8-hour periods, respectively, as compared to the No Action Alternative. Missile Drive between Interstate 25 and 20th Street was also predicted to have an increase of 0.4 ppm for the 8-hour period, as compared to the No Action Alternative. No project-related increases in CO concentrations were predicted for the long term (1990). In fact,

Table 3.2.5-1

PREDICTED CARBON MONOXIDE CONCENTRATIONS AT SELECTED RECEPTORS  
FOR 1985 AND 1990<sup>a</sup>

Roadway Configurations	Averaging Time	Difference Between				Difference Between			
		No Action (1985) (ppm)	Proposed Action (1985) (ppm)	Proposed Action and No Action (ppm)	Proposed Action (1990) (ppm)	No Action (1990) (ppm)	Proposed Action (1990) (ppm)	Proposed Action and No Action (ppm)	
Highway Segments									
Cheyenne, Wyoming									
Interstate 26	1-hour	2.3	2.7	0.4	2.6	2.6	2.6	0	
Interstate 26	8-hour	0.8	0.9	0.1	0.9	0.9	0.9	0	
Interstate 26	1-hour	2.3	2.6	0.3	2.4	2.4	2.4	0	
Interstate 26	8-hour	0.8	0.8	0.0	0.8	0.8	0.8	0	
Interstate 26	1-hour	2.1	2.2	0.1	2.3	2.3	2.3	0	
Interstate 26	8-hour	0.7	0.7	0.0	0.7	0.7	0.7	0	
Interstate 26	1-hour	2.1	2.2	0.1	2.3	2.3	2.3	0	
Interstate 26	8-hour	0.7	0.7	0.0	0.7	0.7	0.7	0	
Interstate 26	1-hour	1.6	1.6	0.0	1.6	1.6	1.6	0	
Interstate 26	8-hour	0.7	0.7	0.0	0.6	0.6	0.6	0	
Interstate 26	1-hour	1.5	1.5	0.0	1.5	1.5	1.5	0	
Interstate 26	8-hour	0.6	0.7	0.1	0.6	0.6	0.6	0	



Table 3.2.5-1 Continued, page 3 of 4  
PREDICTED CARBON MONOXIDE CONCENTRATIONS AT SELECTED RECEPTORS

Roadway Configurations	Averaging Time	No Action (1985) (ppm)	Proposed Action (1985) (ppm)	Difference Between Proposed Action and No Action (ppm)		Proposed Action (1990) (ppm)	No Action (1990) (ppm)	Difference Between Proposed Action and No Action (ppm)	
				No Action (1985) (ppm)	Proposed Action (1985) (ppm)			Proposed Action (1990) (ppm)	No Action (1990) (ppm)
Prairie Avenue (Yellowstone Road to Dell Range Boulevard)	1-hour	7.3	8.4		1.1		7.0	7.0	0
	8-hour	1.9	2.2		0.3		1.9	1.9	0
Central Avenue (Interstate 25 to Yellowstone Road)	1-hour	8.0	9.6		1.6		7.5	7.5	0
	8-hour	2.1	2.5		0.4		2.1	2.1	0
<u>Intersections</u>									
Cheyenne, Wyoming									
16th Street/ Warren Avenue	1-hour	25.6	28.4		2.8		22.5	22.5	0
	8-hour	4.7	5.0		0.3		4.3	4.3	0
Pershing Boulevard/ Central Avenue	1-hour	18.1	23.5		5.4		17.4	17.4	0
	8-hour	3.2	4.0		0.8		3.3	3.3	0
Pershing Boulevard/ Warren Avenue	1-hour	21.9	23.1		1.2		22.1	22.1	0
	8-hour	4.0	4.1		0.1		4.1	4.1	0
Yellowstone Road/ Prairie Avenue	1-hour	27.5	30.7		3.2		24.0	24.0	0
	8-hour	5.4	5.9		0.5		4.9	4.9	0
Pershing Boulevard/ Randall Avenue	1-hour	9.0	10.5		1.5		7.6	7.6	0
	8-hour	1.8	2.1		0.3		1.7	1.7	0
Pershing Boulevard/ Convers Avenue	1-hour	18.9	20.8		1.9		16.4	16.4	0
	8-hour	3.9	4.2		0.3		2.6	2.6	0
20th Street/ Warren Avenue	1-hour	17.2	19.0		1.8		13.9	13.9	0
	8-hour	3.4	3.6		0.2		2.8	2.8	0

Table 3.2.5-1 Continued, page 4 of 4  
PREDICTED CARBON MONOXIDE CONCENTRATIONS AT SELECTED RECEPTORS

Roadway Configurations	Averaging Time	Difference Between				Difference Between			
		No Action (1985) (ppm)	Proposed Action (1985) (ppm)	Proposed Action and No Action (ppm)	No Action (1985) (ppm)	No Action (1985) (ppm)	Proposed Action (1985) (ppm)	Proposed Action and No Action (ppm)	No Action (1985) (ppm)
Dell Range Boulevard/ Ridge Road	1-hour	10.6	11.3	0.7	11.2	11.2	11.2	0	0
	8-hour	2.3	2.4	0.1	2.6	2.6	2.6	0	0
Kimball, Nebraska <sup>1</sup>									
Route 71/U.S. 30	1-hour	6.1	8.1	2.0	5.7	5.7	5.7	0	0
	8-hour	1.2	1.5	0.3	1.2	1.2	1.2	0	0
Wheatland, Wyoming <sup>1</sup>									
16th Street/ South Street	1-hour	18.0	20.7	2.7	16.3	16.3	16.3	0	0
	8-hour	3.3	3.8	0.5	3.1	3.1	3.1	0	0

- <sup>1</sup> Peak year occurs in 1986.  
a Includes 1.0 ppm and 0.5 ppm background carbon monoxide levels for 1 and 8-hour periods, respectively.

decreases in CO concentrations were generally predicted due to anticipated greater usage of vehicular pollution control devices. All 1 and 8-hour predicted CO concentrations were below applicable federal and state ambient air quality standards.

Since CO is primarily associated with congested transportation sources, it is a unique problem for urban areas. No CO impact assessment was performed for construction activities at affected sites, access roads, Deployment Area roads, and cable paths since these areas are primarily rural in nature.

Because of the minimal increases in traffic volumes associated with project alternatives, the impact of CO with respect to construction of any of the alternative road access routes at F E Warren AFB, dispatch station alternatives, or cable path alternatives was predicted to be negligible and not significant.

#### 3.2.5.4.2 Fugitive Dust

##### 3.2.5.4.2.1 Baseline Future No Action Alternative

Increases in fugitive dust emissions will be expected to occur due to population growth and nonproject related construction in the project area. The assessment of these increases was not possible since the exact time, location, type, and level of construction and operational activities are necessary for quantification of impacts. The existing urban fugitive dust (total suspended particulate) background concentration of  $30 \text{ ug/m}^3$  and rural concentration of  $17.5 \text{ ug/m}^3$  have been conservatively assumed to remain constant for the future conditions. During the past several years, ambient levels of total suspended particulates have been decreasing even though population has been increasing. Rural concentrations of total suspended particulates are primarily due to natural sources and agricultural activities, which are expected to remain relatively constant.

##### 3.2.5.4.2.2 Proposed Action

Twenty Four Hour Impacts Maximum 24-hour concentrations of fugitive dust from each proposed facility construction site on F E Warren AFB were predicted to be less than  $1.0 \text{ ug/m}^3$ . Roadway construction activities at F E Warren AFB were predicted to result in maximum concentrations of about  $16 \text{ ug/m}^3$  at a distance of 300 meters from the boundary of the base. The maximum 24-hour concentration from projected residential development construction was predicted to be about  $42.0 \text{ ug/m}^3$  occurring at a distance of 250 meters.

Current projections indicate that approximately 642 miles of roadway may be upgraded to meet necessary specifications for access to the Deployment Area. Roadway construction activities are presently encompassed by resurfacing Option A, which consists of combining part asphalt and part gravel upgrade for existing Defense Access Roads, and resurfacing Option B, which consists of paving all gravel Defense Access Roads. At sites where paving will occur, a mobile asphalt batching plant will be used. In addition, raising of bridge heights and/or lowering of pavement profiles may occur. Analysis of these roadway construction activities, including dumping and grading of materials, results in a predicted maximum 24-hour concentration of  $112 \text{ ug/m}^3$  occurring at a distance of 185 meters.

Analysis of the trenching operations associated with the laying of communications cable results in a predicted concentration of  $15 \text{ ug/m}^3$  at 260 meters.

Proposed construction-related activities in and around Launch Facility sites were predicted to result in a maximum concentration of about  $55 \text{ ug/m}^3$ . No cumulative impacts were predicted between Launch Facility sites.

Fugitive dust resulting from wind erosion at a dispatch station is predicted to result in a maximum concentration of  $3 \text{ ug/m}^3$  at a distance of 200 meters.

**Annual Impacts.** Maximum annual concentrations of fugitive dust from each proposed construction site on F.E. Warren AFB were predicted to be about  $0.3 \text{ ug/m}^3$  and occurred at the AFB boundary, at a distance of 600 meters.

Annual impact analyses were not undertaken for roadway construction at F.E. Warren AFB, residential development construction, roadway construction in the Deployment Area, Launch Facility construction, dispatch stations, or cable trenching operations because these activities would be of a limited and temporary nature at any given location.

In summary, the 24-hour and annual analyses indicate that the impact of fugitive dust concentrations, when added to the appropriate rural or urban background values, will be low and not significant.

The impact of fugitive dust with respect to construction of any of the alternative road access routes at F.E. Warren AFB and cable path alternatives was predicted to be low and not significant while the impact of the dispatch station alternatives was predicted to be negligible and not significant.

#### 3.2.5.4.3 Visibility

##### 3.2.5.4.3.1 Baseline Future - No Action Alternative

The median yearly visual range of 64 miles for the project area is expected to be unchanged.

##### 3.2.5.4.3.2 Proposed Action

No degradation of regional visibility at the nearest Prevention of Significant Deterioration Class I areas (Rocky Mountain National Park and Rawah Wilderness) was predicted, thus the short and long-term impacts were predicted to be negligible and not significant.

The impact on regional visibility with respect to construction of any of the alternative road access routes at F.E. Warren AFB, dispatch station alternatives, or cable path alternatives was predicted to be negligible and not significant.

#### 3.2.5.5 Summary of Impacts

##### 3.2.5.5.1 Explanation of Detailed Impact Matrix

The air quality impact matrix presents results of the various analyses performed in this study including a summary of the levels of impact and significance determination for each element (Figure 3.2.5-1). The overall aggregated levels of impact and significance determination are also provided in Figures 3.0-1 and 3.0-2.

Low, short-term, not significant local impacts of CO were predicted for several intersections and road segments in Cheyenne, Kimball, and Wheatland. Construction activities in Cheyenne and the Deployment Area were predicted to result in low, short-term, not significant local impacts and negligible, short-term, not significant regional impacts of fugitive dust. Negligible, short-term, not significant regional impacts on visibility were also predicted.





All long-term impacts for the three air quality elements were predicted to be negligible and not significant due to minimal increases in vehicular traffic and construction activity during project operations.

All the alternative road access routes at F E Warren AFB and cable path alternatives were predicted to result in low, not significant impacts of fugitive dust and negligible, not significant impacts of CO and visibility while the impact of all the dispatch station alternatives were predicted to be negligible and not significant.

### 3.2.5.2 Aggregation of Elements, Impacts, and Significance

Figure 3.0-1 presented the aggregation of impacts for all resources including air quality. The aggregated rating of air quality for the Proposed Action resulted in low, short-term, not significant local impacts, negligible, short-term, not significant regional impacts, and negligible long-term, not significant local and regional impacts. The alternatives aggregated to a low, not significant impact for the F E Warren AFB access road and the cable paths. The dispatch station alternatives will have negligible, not significant impacts (Figure 3.0-2).

Determination of the overall impact rating for air quality involved aggregation of the impact ratings for the elements (components) of air quality. The air quality components were evaluated as described in Section 3.2.5.4 and then aggregated to the resource level by giving a higher weighting factor to the impacts and significance of those components which have the potential to cause health effects (which may be equivalent to causing exceedance of standards). Ambient air quality standards have been established by the EPA and in some cases (i.e., Wyoming), redefined more stringently by state regulatory agencies. These standards set concentration limits which are not to be exceeded by a new or modified emissions source when added to background concentrations. Both CO and fugitive dust were given an equal but higher weighting factor than visibility. Since air quality levels are determined by the cumulative impact of all atmospheric pollutants, the pollutant ("criteria pollutant") with the highest impact and significance would influence the overall air quality level of impact and significance.

### 3.2.5.6 Mitigation Measures

Potential mitigation measures that will be considered are identified below. None, some, or all of the mitigation measures may ultimately be selected. Each measure identifies the parties responsible to implement, but not necessarily to pay for, the measure, as well as the timing of implementation, if appropriate, and the anticipated effectiveness of the measure.

- o Use of covered trucks to haul aggregate to construction sites. This mitigation measure may be up to 90 percent effective in decreasing the quantity of atmospheric resuspension of particulate matter as trucks travel from borrow areas to Deployment Areas. If selected, this measure should be incorporated into design specifications prior to the onset of construction activities, i.e., spring 1984. The responsible agencies for implementation of this mitigation measure are the Air Force and State and local departments in conjunction with project contractors.
- o Use of tarpaulin and/or revegetation on disturbed surfaces. The covering of aggregate storage piles with tarpaulins and the revegetation of disturbed surface areas, primarily a longer term measure, may be up to 90 percent effective in reducing the quantity of potential atmospheric resuspension of particulate matter. If selected, this mitigation measure should be incorporated into design specifications.

prior to the onset of construction activities, i.e. spring 1984. The responsible agencies for implementation of this mitigation measure are the Air Force and State and local departments in conjunction with project contractors.

- o Speed restrictions for vehicles traveling on unpaved roads. Since at higher vehicular speeds greater quantities of particulate matter are suspended from the unpaved roadway, the mitigation measure may be up to 80 percent effective in reducing fugitive dust emissions on Deployment Area roadways. If selected, this measure should be implemented at the onset of Deployment Area construction activities, i.e. spring 1985. The responsible agencies for implementation of this mitigation measure are the Air Force on F.E. Warren AFB and other governmental agencies outside F.E. Warren AFB.

### 3.2.5.7 Unavoidable Adverse Impacts

Short-term, short-duration unavoidable adverse air quality impacts due to fugitive dust emissions from construction activities would occur. Additionally, temporary increases in urban vehicular-related carbon monoxide concentrations would occur. No unavoidable long-term air quality impacts have been identified through the course of this assessment.

### 3.2.5.8 Irreversible and Irretrievable Resource Commitments

Implementation of the Proposed Action would result in no irretrievable or irreversible resource commitments with respect to air quality.

### 3.2.5.9 The Relationship Between Local Short-Term Use of Man's Environment and Maintenance and Enhancement of Long-Term Productivity

Implementation of the Proposed Action would result in short-term air quality impacts primarily associated with the construction phase of the project. These impacts include increases in fugitive dust and vehicular CO emissions. No long-term air quality impacts have been identified and, hence, no effect on the maintenance and enhancement of long-term productivity is anticipated.

## **4.0 COORDINATION WITH OTHERS**

### **4.1 Introduction**

In accordance with the Council on Environmental Quality regulations, preparation of this environmental impact statement (EIS) included two phases during which the Air Force solicited the views of the public: 1) Scoping Activities and 2) Public Review and Comment.

Following publication of the Notice of Intent to prepare the EIS, scoping meetings were held to gain input from the public. The Council on Environmental Quality regulations (40 C.F.R. 1500-1508) for implementation of the National Environmental Policy Act require "an early and open process for determining the scope of issues related to the proposed action." The purposes of scoping are:

- 1) To identify the significant issues for study in the EIS, and
- 2) To determine the scope of the research for each issue.

Following preparation of the draft environmental impact statement (DEIS) a Notice of Availability was published and a 45-day public review and comment period was initiated. The Council on Environmental Quality regulations (40 C.F.R. 1503.1) state that after preparing a draft environmental impact statement and before preparing a final environmental impact statement the agency shall:

- 1) Obtain the comments of any Federal agency which has jurisdiction by law or special expertise with respect to any environmental impact involved or which is authorized to develop and enforce environmental standards.
- 2) Request the comments of:
  - a) appropriate state and local agencies which are authorized to develop and enforce environmental standards;
  - b) Indian tribes, when the effects may be on a reservation; and
  - c) any agency which has requested that it receive statements on actions of the kind proposed.
- 3) Request comments from the applicant, if any.
- 4) Request comments from the public, affirmatively soliciting comments from those persons or organizations who may be interested or affected.

## **4.2      Scoping Activities**

A three-phased scoping process was part of the assessment of the environmental impacts of the proposed deployment of Peacekeeper missiles. Prescoping, the first phase, consisted of all activities that preceded the formal scoping meetings. Prescoping activities assisted in the early identification of issues, familiarized the Air Force with local concerns, and identified data availability. Prescoping began in June 1983 with a review of the information collected for the Peacekeeper Closely Spaced Basing project. This included a review of the work-in-progress environmental planning technical reports prepared for each resource group under the Closely Spaced Basing project. The Air Force also concentrated on developing an understanding of the study area and of the local concerns within the study area. This was accomplished through a series of contacts with a variety of governmental and private entities, and the exchange and gathering of data. A system of key contacts was jointly established by representatives of the Air Force; the cities of Cheyenne, and Kimball; the towns of Torrington and Wheatland; the counties of Laramie, Goshen, Platte, Banner, and Kimball; and the states of Wyoming and Nebraska. These contacts, in addition to those with federal, Colorado state and local agencies, individuals, and private groups in all states, were made to gain a basic understanding of the study area and its concerns.

The second phase was a set of formal public scoping meetings. Participants included federal, state, and local agencies; organizations; interest groups; and the general public in the geographic area potentially affected by the proposed project. Meetings were held on the following dates in the noted locations.

June 27, 1983 7:00 PM	East High School Cheyenne, Wyoming
June 28, 1983 1:00 PM	Central High School Cheyenne, Wyoming
June 28, 1983 7:00 PM	Pine Bluffs High School Pine Bluffs, Wyoming
June 29, 1983 7:00 PM	Harrisburg Public School Harrisburg, Nebraska
June 30, 1983 7:00 PM	Kimball County High School Kimball, Nebraska
July 1, 1983 1:00 PM	Eastern Wyoming College Torrington, Wyoming
July 1, 1983 7:00 PM	Wheatland High School Wheatland, Wyoming

In addition to the public scoping meetings, three meetings were held in the following locations:

July 6, 1983 1:00 PM	Federal Offices - EPA Region VIII Denver, Colorado
July 7, 1983 9:00 AM	Federal Offices - EPA Region VII Kansas City, Missouri
July 8, 1983 8:00 AM	State of Nebraska Lincoln, Nebraska

At scoping meetings, handouts entitled "Peacekeeper in Minuteman Silos Environmental Impact Statement Process" were distributed along with comment sheets. Participants were encouraged to express their comments to the Air Force, either verbally or in writing, at the meeting or by mail before July 10, 1983.

Each scoping meeting convened in a main auditorium with an introductory presentation by the Air Force that explained:

- o The Peacekeeper scoping process;
- o The major features of the Peacekeeper system; and
- o The schedule for the EIS and definitions of major resource categories under consideration.

In a question-and-answer period after the presentation, comments were invited from the public concerning the environmental impacts of the deployment of the Peacekeeper system. Following the hour-long question-and-answer period, the group was asked to adjourn to any of ten separate workshop groups established to encourage the exchange of detailed information and identify specific issues of concern. Air Force representatives were available for detailed discussion and to record the concerns of the public. The ten workshop groups were:

- Peacekeeper System Definition/Policy
- Socioeconomics/Public Services and Facilities
- Water Resources
- Biological Resources
- Utilities/Energy
- Land Use
- Cultural Resources
- Transportation
- Air Quality/Noise
- Geologic Resources

Within each workshop group the Air Force representative made a short presentation that defined the particular environmental resource being addressed, the proposed study methods, the areas of interest, and the initial data collected. Information concerning these areas was included in the handouts. The workshop was then opened for general discussion and comment.

The time allotted for the workshop discussions was one and one-half hours, and the Air Force workshop presentations were limited to 15 or 20 minutes. This allowed the public to move from one workshop to another to express their various concerns. As part of the workshop, public comments and issues were recorded by Air Force representatives.

The third phase of the scoping process included the analysis and documentation of the concerns and issues generated during the first two phases of scoping.

These concerns and issues were obtained from the following:

- o Prescoping contacts and data;
- o Information gathered at public scoping meetings;
- o Information gathered at public scoping workshops; and
- o Public comment (written and verbal).

During this phase, the Air Force considered all information generated during prescoping and scoping, as well as public comments pertinent to specific areas. Issues were summarized and a determination made as to whether or not the EIS should address an issue.

Those individuals attending the scoping meetings were asked to register. The lists on the following pages include those who chose to register at the scoping meetings and those who submitted written comments during the scoping process.

**EAST HIGH SCHOOL  
Cheyenne, Wyoming  
June 27, 1983 - 7:00 PM  
SCOPING MEETING ATTENDANCE LIST**

Mary Ackerman  
Mr. & Mrs. Roger Auby  
Tom Bougsty  
Sharon Breitweiser  
Kilomae Brown  
Elizabeth Brumage  
Richard Bryant  
Linda Best  
Lynn Birlieff  
Mary Ann Buscaj  
Fred Cariaso  
Neil Carroll  
John Cato  
James Castberg  
Andrea Conboy  
Dave Cromley  
Dennis E. Curran  
John Curtis  
Liza Daly  
Kathy Darcy  
Thomas DeHoff  
Diane Denison  
Jessica Denison  
Harvey Deselms  
Kenneth Deselms  
Norma Deselms  
Dale Doremis  
William Edwards  
Darren Erickson  
J. Erickson  
Seath Fanir  
Mauriel Frank  
Joe Gonzales  
Janet Gordon  
Scott Gray  
Gwynne Hallock  
Celise Hand  
Ed Heimsoth  
Mark Hindenmeyer  
Keith Johnson  
Kathie Joyner  
Richard Kean  
John Kefalos  
Bernard W. Kelly  
Bob Kimble  
Tom Kilty  
Mark Koons  
Florence Kornegay

Jeachim Mallock  
Kevin Mallok  
Lou Mankus  
Janet Marks  
Prudy Marshall  
Craig McCune  
Dave McGuire  
Vivian McMullen  
Mary Lou Melling  
Lisa Moore  
Jim O'Connor  
Brian D. Olson  
Sally L. Palmer  
John Payne  
John Pederson  
John Pederson II  
Charles Pelbey  
Linda Putman  
KFBC Radio  
John Rainier  
Doug Reeves  
Matthew Reinlsauin  
Jack Reppert  
Paul Ross  
Randy Ross  
Sister Frances Russell  
Sam Sang  
Anne Saunders  
Beverly Schwieger  
Paul Schwieger  
M. Shaw  
Donna Spohn  
Doris Stansbury  
Joe Stern  
Tim Strand  
Pat Swan  
Amy Tamlin  
Rev. Robert E. Thomas  
Jim Thompson  
T.J. Tobias  
Cathy S. Walters  
Susan Webster  
Dianne Wiganowsky  
Wm. Wiganowsky  
C.F. Williams  
Liz Williams  
Thomas Williams  
Nancy Williams



**EAST HIGH SCHOOL (continued)**

Sid Kornegey  
Bonnie Lace  
Earlene Long

John Winkel  
Jim Woodward

**CENTRAL HIGH SCHOOL**

Cheyenne Wyoming

June 28, 1983 - 1 00 PM

**SCOPING MEETING ATTENDANCE LIST**

Steve Achter  
Betty Sue Allen  
Wayland Anderson  
John Barnett  
Diedre Broick  
Cary Buod  
Jim Castberg  
Joe Clements  
Joseph Clements  
John Dean Jr  
Dan Deshaney  
Dale Dorems  
Gwen Finderson  
Mrs. Frank Galicia  
Dennis N. Grasso  
Lorraine Grigsby  
Alice M. Iverson  
Lorna Johnson  
Julia Judson  
Mrs. Rodney Kirkbride  
Edmond Levering  
David Lukins  
Michael McFaul  
Jerry Morse  
Sue Murray  
Fred & Nadine Newland  
Bob Nicholls  
Marjorie O'Brien

Garry Oliver  
Grant Parker  
Maury Palmbeck  
Val Roberts  
David Romero  
Byron Rookstool  
Paul Ross  
John Sandahl  
Sam Sang  
Tammy Schupback  
Amy Seidl  
Margaret Shaw  
Anna Sherman  
Virgil Slough  
Joan Snow  
Joan Stout  
Gary Thorson  
John Turner  
Bob Unruh  
Ed Usui  
Richard Vose  
Rosann Wattonville  
Leroy Willard  
Rev. J. Willard  
Mark Winkel  
Reed Zarg

**PINE BLUFFS HIGH SCHOOL**

Pine Bluffs, Wyoming

June 28, 1983 - 7:00 PM

**SCOPING MEETING ATTENDANCE LIST**

Theron Anderson  
Warren & Artise Anderson  
Lawrence Andrey  
Mr. & Mrs. Ed Baker  
Mrs. Kevin Baker

Carey Lann  
Robert Lyons  
Jim O'Connor  
A. Marcos Crtiz  
Mary Pearson

**PINE BLUFFS HIGH SCHOOL (continued)**

**B. Behrends**

**John Culek, Jr**

**Margaret Dolson**

**F. Fiskes**

**Phyllis Grase**

**Bill Grass**

**David Hanson**

**Lynn Horsley**

**Mark Rea**

**Thomas Romig**

**E. G. Sanders**

**Lori Sanders**

**Dick Stasbalski**

**Jake Thimesch**

**Steve Wordeman**

**HARRISBURG PUBLIC SCHOOL**

**Harrisburg, Nebraska**

**June 29, 1983 - 7:00 PM**

**SCOPING MEETING ATTENDANCE LIST**

**Bill Abell**

**Betsi Barrash**

**Warren Barrash**

**Ron Barrett**

**Doug & Barb Beezley**

**Eva Jean Beltner**

**R. T. Brandt**

**Ron Cacek**

**Don Christensen**

**Stan Christensen**

**Victoria A. Compton**

**Frank Costa**

**Catherine Dalton**

**Lane Darnall**

**Glenn David**

**Barbara Dorily**

**Norma Dove**

**Diane Dunkerson**

**Rev. Roddy Dunkerson**

**Sue Ehrman**

**D. C. Eter**

**Wendy Farwell**

**Warren Frank**

**T. J. Fraser**

**Tim Gaines**

**Florence Gifford**

**Kathy Glatz**

**Rev. Miguel Guevara**

**Betty Hayward**

**Lucille Hilliard**

**Elsie Hinrichs**

**Conley Hinrichs**

**Byrle Hopkins**

**Helen Hopkins**

**Kenneth Hopkins**

**Monty L. Hopkins**

**Polly Hopkins**

**Barb Jansen**

**Dave Mohr**

**Mrs. K. Nelson**

**Norman Nelson**

**William Nelson**

**Takanoro Nishida**

**Alois W. Neal**

**Martin Olsen**

**Bill & Donna Olsen**

**Nancy Olsen**

**Mary L. Olsen**

**Howard Osborn**

**Steve Osborn**

**Nellie Red Owl**

**W. F. Palmer**

**Charles Person**

**W.C. Peters**

**Elaine Pile**

**Robert Pile**

**George Ramiz**

**Don Richards**

**Carol E. Richards**

**John Roberts**

**Melra Roberts**

**Martha Rohrick**

**Jay Rundell**

**Julia Rundell**

**Kathy Ruser**

**Kevin Ruser**

**Floyd Sank Jr.**

**Danette Saunders**

**Eric Snook**

**Ivy Snowden**

**C. W. Stoddard**

**Robert Stoddard**

**Orvill Sulk**

**Kathy Sullivan**

**Arkie Suocken**

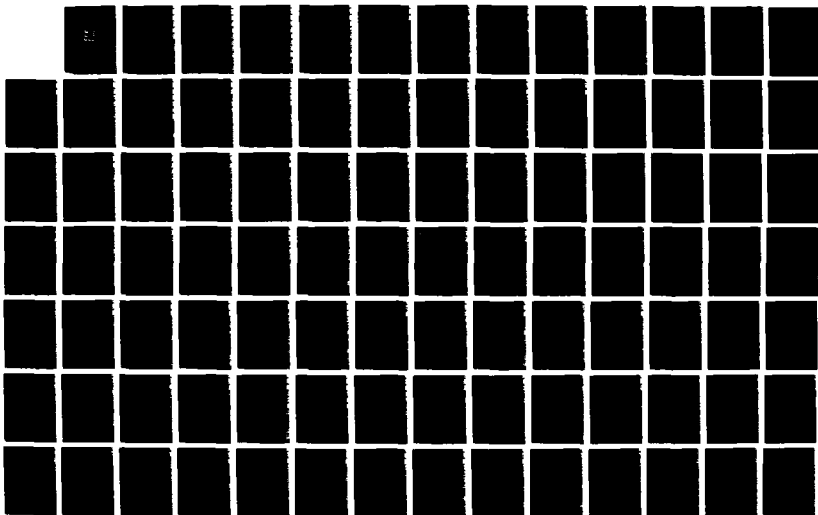
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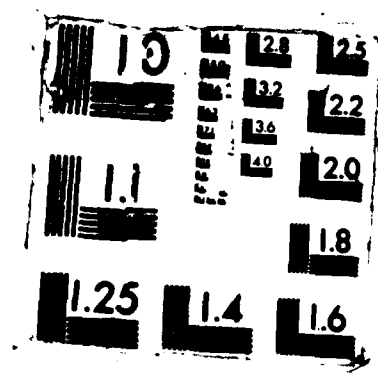
FINAL ENVIRONMENTAL IMPACT STATEMENT PEACEKEEPER IN  
MINUTEMAN SILOS FE WARREN AFB WYOMING VOLUME 1(U) AIR  
FORCE REGIONAL CIVIL ENGINEER-MX NORTON AFB CA JAN 84  
F/G 16/1

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**HARRISBURG PUBLIC SCHOOL (continued)**

Byron Jensen  
Jim Jensen  
Marv Kammerer  
Judi Kohler  
C. Lander  
Leonard Larson  
Mr. & Mrs. Norris Leafdale  
Don Lease  
Bill Lyon  
Marjorie Mandujano  
Donald Mai  
Rusty Mecklem  
Donald & Lenore Miles

Joann Tall  
S. Tamarak  
Robert Thompson  
Beef Torey  
Frances Towner  
Raynor Towner  
Carl Van Pelt  
Carol Walker  
Chuck Warren  
Anneliese Weisz  
Eugene White Hawk  
Mico Yellow Hair

**KIMBALL COUNTY HIGH SCHOOL**

Kimball, Nebraska

June 30, 1983 - 7:00 PM

**SCOPING MEETING ATTENDANCE LIST**

Bill Abell  
Frank Acosta  
Robert E. Arraj  
Warren Barrash  
Bill Batterton  
Martha Beaman  
Chuck & Patti Benstead  
Ed Bigler III  
Geraldine Bonkiewicz  
Marjorie C. Borchec  
Vernon J. Bourlier  
E. C. Bradney  
Ferne Bradney  
Lloyd & Pauline Carr  
Byron Collins  
Carol Dunegan  
Mike Fastenau  
Darrell Fischer  
Mr. & Mrs. Al Forsling  
Clyde Gadeken  
Gary Gibbons  
Mayor Edith Haines  
Eldon & Lori Jean Halstead  
Mike Hartzler  
Mr. & Mrs. Fred Hilkemeier

Jim Jensen  
Mr. & Mrs. Jerry Knutsen  
Mike Konz  
Jerome Lenzen  
Marian Lenzen  
James Lodes  
Bill Lyon  
Chris Miller  
Rev. James Mazurek  
Ralph Olsen  
John & Jean Perkins  
Virgil G. F. Raddatz  
George Radil  
Walt Roberts  
Gary E. Robinson  
Jim & Sheri Robinson  
Martha Rohrick  
Harold Sobotka  
Carl Schwindt  
Mr. & Mrs. Henry Stahla  
Rev. James Thacker  
John Underdown  
J. L. Volkmer  
R. R. Woolsey  
Bonnie Ziemann

**EASTERN WYOMING COLLEGE**  
Torrington, Wyoming  
July 1, 1983 - 1:00 PM  
SCOPING MEETING ATTENDANCE LIST

Carol Ackerson  
Harold Anderson  
Frank Barrett  
Kevin Bohnenblust  
Harold Bovee  
Flo Burden  
Beverly Byrum  
Michael Carr  
Alex Chamberlain  
Joe Clements  
Gail Craig  
Andrew Denison  
Don Deen  
Sandra Dohm  
Rev. Roddy Dunkerson  
Beverly Ericksen  
Jim Fuller  
Sandy Fuller  
Bill Marsh  
Jack Matthew  
Earl Michael  
Lisa Moore  
Kevin Mooney  
Albert Muller  
Maxine Muller  
Irvin Norine  
June Oaks  
Nancy Otto  
Lee Otto  
Thomas Palmerlee  
Mary Paxson  
Marilyn Punke  
Tim Punke  
Verle Punke  
Linda Putnam

David Gaines  
Curtis Grandstaff  
Helen Goeling  
Rev. Miguel Guevara  
Julian Hadley  
George Hankin  
Sandra Hansen  
Marcia Hayatt  
Maria Hart  
Elizabeth Jensen  
Richard Kent  
Jeff Kelly  
Ruth Keogh  
Bob Kimble  
Harvey F. Lattium  
David Lukins  
Joseph Mancuso  
J. E. Maroney  
Tim St. Onge  
Richard Schultz  
Tahoma Schultz  
Carl Setright  
Charles Sharp  
Francis Sharp  
Phil Shellen  
Marv Smith  
David Tompkins  
Mr. & Mrs. George F. Urbanek  
Stephen Walker  
Andrea Watson  
Michael Wentik  
Rob Wilcox  
Diane Yoder  
Dorothy Zavorka  
Marjorie Zavorka

**WHEATLAND HIGH SCHOOL**  
July 1, 1983 - 7:00 PM  
SCOPING MEETING ATTENDANCE LIST

Frank Ahearn  
Allegra Anderson  
S. Armandc  
Jeanette Barber  
Roger Barber  
Kevin & Mary Kay Bohnenblust  
Andy Booz  
Bonita Boyer  
Gail Morley-Bryant

Mrs. Myrna Hanna  
Eileen M. Heneny  
Jim Hicks  
Kent Kermin  
Ernie Kittell  
Mark Koons  
David P. Lovetere, P.E.  
John Montgomery  
John Murray

**WHEATLAND HIGH SCHOOL (continued)**

**Mary Ann Buscaj  
Joe Clements  
Norm Crocker  
Betty Dower  
Bud Dower  
Pat Ferrier  
Myrtle Flaherty  
Jenny Geringer  
Mr. & Mrs. Jim Geringer  
Julian L. Hadley**

**Sue Nelson  
Ruthann Norris  
Jim Ritterhouse  
Dee Rodekohr  
Ronald V. Rufenacht  
Kenneth Saunders  
Diona Savoy-Marcus  
Carolyn Teter  
Willard J. Weberg**

**FEDERAL OFFICES - EPA REGION VIII  
Denver, Colorado  
July 6, 1983 - 1:00 PM  
SCOPING MEETING ATTENDANCE LIST**

**Monte Mingus  
Federal Emergency Management Agency**

**Howard Chase  
Small Business Administration**

**John Andersen  
U.S. Army Corps of Engineers**

**Dave Davies  
U.S. Dept. of Agriculture  
Forest Service**

**Timothy Hepp  
U.S. Dept. of Housing and  
Development**

**David Le Fevre  
U. S. Dept. of Housing and Urban  
Development**

**Robert E. Pizel  
U.S. Dept. of the Interior  
Bureau of Land Management**

**William C. Evans  
U.S. Dept. of Transportation**

**Stan Oleson  
U.S. Dept. of Transportation  
Federal Aviation Administration**

**Mike Hammer  
U.S. Environmental Protection Urban  
Agency**

**FEDERAL OFFICES - EPA REGION VII  
Kansas City, Missouri  
July 7, 1983 - 9:00 AM  
SCOPING MEETING ATTENDANCE LIST**

**Marlee Carroll  
Federal Emergency Management Agency**

**William A. Powell  
Small Business Administration**

**Ron Brown  
U.S. Dept. of Energy**

**Gary Uttican  
U.S. Dept. of Housing and  
Urban Development**

**Grant Peters  
U.S. Dept. of Transportation**

**Patricia Keyes  
U.S. Dept. of Transportation**

**Jim Meyers  
U.S. Dept. of Transportation  
Federal Aviation Administration**

**Terry Deen  
U.S. Environmental Protection Agency**

**FEDERAL OFFICES - EPA REGION VII (continued)**

**Lance Long**  
U.S. Dept. of Housing and  
Urban Development

**Dick Taylor**  
U.S. Dept. of the Army  
Corps of Engineers

**Bob Ruf**  
U.S. Dept. of the Army  
Corps of Engineers

**Nelson Krueger**  
U.S. Dept. of Transportation

**Bob Fenemore**  
U.S. Environmental Protection Agency

**Ron Ritter**  
U.S. Environmental Protection Agency

**Edward Vest**  
U.S. Environmental Protection Agency

**Glen Yaeger**  
U.S. Environmental Protection Agency

**STATE OF NEBRASKA**  
**Lincoln, Nebraska**  
**July 8, 1983 - 8:00 AM**  
**SCOPING MEETING ATTENDANCE LIST**

**Mark Martin**  
Nebraska Crime Commission

**Robert L. Tagg**  
Nebraska Crime Commission

**John Larson**  
Nebraska Dept. of Aeronautics

**U. Gale Hutton**  
Nebraska Dept. of Environmental  
Control

**Bill Edwards**  
Nebraska Dept. of Motor Vehicles

**Ginger Goomis**  
Nebraska Dept. of Public Welfare

**Mike Gomez**  
Nebraska Dept. of Revenue

**Rollie Heedum**  
Nebraska Dept. of Roads

**Don Westover**  
Nebraska Forest Service

**Bill Bailey**  
Nebraska Game & Parks Commission

**Gerald Chaffin**  
Nebraska Games & Parks Commission

**Rod Wagner**  
Nebraska Library Commission

**E.P. Schroede**  
Nebraska Real Estate Commission

**Steve Soberski**  
Nebraska Resources Commission

**Larry Nedrow**  
Nebraska State Civil Defense Agency

**J. Buist**  
Nebraska State Patrol

**W. Palmer**  
Nebraska State Patrol

**Ken Wade**  
Nebraska Supreme Court

**Randall Pence**  
Representing Senator Zorinsky  
U.S. Senate

**Marvin P. Carlson**  
University of Nebraska

**Betty Olson**

**Don Tittey**

**Larry K. Zink**



# WRITTEN COMMENTS SUBMITTED

Mary Ackerman  
Carol Ackerson  
Given Anderson  
Harold D. Anderson, R.S.  
Sharon Breitweiser  
Lt. Col. J. E. Buist  
Mrs. Florence Buredon  
Mary Ann Buscay  
Andrea L. Cook  
Richard Deyo  
Betty Jean Dower  
G. J. Edwards  
Joel Engelhardt  
Mayor Don Erickson  
Friends of the Earth  
Kathleen Glatz, R.N.  
James L. Green  
Mayor Edith Haines  
Charles H. Hajinian  
Gwynne Hallock  
Elwood and Myra H. Hanna  
Elizabeth Marsh Jensen  
Jimmie E. Jinks  
Kathie Joyner  
John Kefalas  
Ernie Kittell  
Laramie Co. Health Planning  
Committee  
Louis Leichtweis  
Marian Lenzen  
Mark Lindenmeyer  
Don Mai  
Mary Lou Marcum

Prudy S. Marshall, Ph.D.  
David McGuire  
Vivian J. McMullen  
Mrs. Lenore P. Miles  
Paul A. Moyer  
Diona Savoy-Marcus  
Nebraska Library Commission  
Nebraskans for Peace/  
Scottsbluff Chapter  
Herman Noe  
Garry Oliver  
Lee A. Otto  
Nellie Red Owl  
Major W. F. Palmer  
The Planning Studio  
Melon Roberts  
Paul R. Ross  
Sister Frances Russell  
Doris Stanbury  
Lloyd Sisson  
Eric Snook  
Janet Snyder  
Joe Stern  
Tim Strand, O.D.  
Kathleen Talgoom  
Joann Tall  
Frances S. Towner  
Tri-State MX Coalition  
Upland Industries Corporation  
Susan Webster  
Western Solidarity  
Wyoming Church Coalition  
Wyoming Recreation Commission

### **4.3      DEIS Distribution For Public Review and Comment Period**

A 45-day public review and comment period for the DEIS formally began on October 14, 1983, when a Notice of Availability was published in the Federal Register. Distribution of the DEIS was made to solicit comments on the DEIS, as required by the CEQ regulations.

During the week of October 7, 1983, the document was mailed to elected officials, federal, state, and local governments, public libraries, interest groups, and individuals who submitted comments during the scoping process.

The DEIS was also made available to those who requested a copy during the review and comment period. The document was shipped to those persons who requested a copy from the Air Force, within two days of receiving their request.

#### **4.3.1      Initial Distribution of the DEIS**

The following agencies, groups, and individuals received copies of the DEIS at the time the Notice of Availability was published in the Federal Register. These include elected officials, appropriate federal, state, and local agencies, public libraries, special interest groups, individuals or agencies who requested a copy prior to release of the DEIS, and people who submitted written comments during the scoping process.

### **MEMBERS, UNITED STATES CONGRESS**

#### **Senate Committees**

##### **Chairman**

Honorable John G. Tower  
Chairman, Committee on  
Armed Services  
United States Senate

Honorable Mark O. Hatfield  
Chairman, Committee on  
Appropriations  
United States Senate

Honorable Ted Stevens  
Chairman, Subcommittee on Defense  
Committee on Appropriations  
United States Senate

Honorable William V. Roth, Jr.  
Chairman, Committee on  
Governmental Affairs  
United States Senate

Honorable Pete V. Domenici  
Chairman, Committee on Budget  
United States Senate

##### **Ranking Minority Member**

Honorable Sam Nunn  
United States Senate

Honorable John C. Stennis  
United States Senate

Honorable John C. Stennis  
United States Senate

Honorable Thomas F. Eagleton  
United States Senate

Honorable Lawton Chiles  
United States Senate

**Senate Committees (continued)**

**Chairman**

**Honorable Strom Thurmond**  
**Chairman, Subcommittee on Military**  
**Construction and Stockpiles**  
**Committee on Armed Services**  
**United States Senate**

**Honorable Mack Mattingly**  
**Chairman, Subcommittee on Military**  
**Construction**  
**Committee on Appropriations**  
**United States Senate**

**House Committees**

**Chairman**

**Honorable Melvin Price**  
**Chairman, Committee on**  
**Armed Services**  
**House of Representatives**

**Honorable Jamie L. Whitten**  
**Chairman, Committee on**  
**Appropriations**  
**House of Representatives**

**Honorable Joseph P. Addabbo**  
**Chairman, Subcommittee on**  
**Defense**  
**Committee on Appropriations**  
**House of Representatives**

**Honorable William D. Ford**  
**Chairman, Committee on Post**  
**Office and Civil Service**  
**House of Representatives**

**Honorable James R. Jones**  
**Chairman, Committee on Budget**  
**House of Representatives**

**Honorable W. G. (Bill) Hefner**  
**Chairman, Subcommittee on Military**  
**Construction**  
**Committee on Appropriations**  
**House of Representatives**

**Ranking Minority Member**

**Honorable Gary Hart**  
**United States Senate**

**Honorable James Sasser**  
**United States Senate**

**Ranking Minority Member**

**Honorable William L. Dickinson**  
**House of Representatives**

**Honorable Silvio O. Conte**  
**House of Representatives**

**Honorable Jack Edwards**  
**House of Representatives**

**Honorable Gene Taylor**  
**House of Representatives**

**Honorable Delbert L. Latta**  
**House of Representatives**

**Honorable Ralph Regula**  
**House of Representatives**

**House Committees (continued)**

**Honorable Ronald V. Dellums**  
**Chairman, Subcommittee on Military**  
**Installations and Facilities**  
**Committee on Armed Services**  
**House of Representatives**

**Honorable Ken Kramer**  
**House of Representatives**

**STATE DELEGATIONS**

**Nebraska Delegation**

**Honorable J. James Exon**  
**United States Senate**

**Honorable Edward Zorinsky**  
**United States Senate**

**Honorable Virginia Smith**  
**House of Representatives**

**Honorable Hal Daub**  
**House of Representatives**

**Honorable Douglas Bereuter**  
**House of Representatives**

**Wyoming Delegation**

**Honorable Alan K. Simpson**  
**United States Senate**

**Honorable Malcolm Wallop**  
**United States Senate**

**Honorable Richard B. Cheney**  
**House of Representatives**

## **FEDERAL OFFICES**

**Advisory Council on Historic  
Preservation  
Washington, DC**

**U.S. Dept. of Agriculture  
Forest Service  
Washington, DC**

**U.S. Dept. of Agriculture  
Office of the Secretary  
Washington, DC**

**U.S. Dept. of Commerce  
Office of Administration  
Washington, DC**

**U.S. Dept. of Education  
Office of the Secretary  
Washington, DC**

**U.S. Dept. of Energy  
Deputy Assistant Secretary for  
Environment, Safety, and Health  
Washington, DC**

**U.S. Dept. of Housing and  
Urban Development  
Office of the Secretary  
Washington, DC**

## **FEDERAL OFFICES - EPA REGION VII**

**Federal Emergency Management Agency  
Kansas City, MO**

**Small Business Administration  
Kansas City, MO**

**U.S. Dept. of Energy  
Kansas City, MO**

**U.S. Environmental Protection Agency  
Kansas City, MO**

**U.S. Dept. of Housing and  
Urban Development  
Kansas City, MO**

**U.S. Dept. of the Army  
Corps of Engineers  
Washington, DC**

**U.S. Dept. of the Interior  
Environmental Project Review  
Washington, DC**

**U.S. Dept. of the Navy  
Navy Facilities Engineering Command  
Alexandria, VA**

**U.S. Dept. of Transportation  
Washington, DC**

**U.S. Dept. of Transportation  
Federal Highway Administration  
Washington, DC**

**U.S. Environmental Protection Agency  
Washington, DC**

**U.S. Dept. of Labor  
Kansas City, MO**

**U.S. Dept. of the Army  
Corps of Engineers  
Kansas City, MO**

**U.S. Dept. of Transportation  
Kansas City, MO**

**U.S. Dept. of Transportation  
Federal Aviation Administration  
Kansas City, MO**

## FEDERAL OFFICES - EPA REGION VIII

Federal Emergency Management Agency  
Denver, CO

Small Business Administration  
Denver, CO

U.S. Dept. of Agriculture  
Forest Service  
Lakewood, CO

U.S. Dept. of Housing and  
Urban Development  
Denver, CO

U.S. Dept. of the Army  
Corps of Engineers  
Omaha, NE

U.S. Dept. of the Interior  
Bureau of Land Management  
Denver, Co

## INDIAN TRIBE REPRESENTATIVES

Nebraska Indian Commission  
Office of the Director  
Lincoln, NE

Nebraska Indian Commission  
Office of the Assistant Director  
Scottsbluff, NE

U.S. Dept. of the Interior  
Bureau of Indian Affairs  
Aberdeen, SD

U.S. Dept. of the Interior  
Bureau of Mines  
Denver, CO

U.S. Dept. of Transportation  
Federal Aviation Administration  
Aurora, CO

U.S. Dept. of Transportation  
Federal Highway Administration  
Denver, CO

U.S. Environmental Protection Agency  
Denver, CO

U.S. Dept. of the Interior  
Bureau of Indian Affairs  
Albuquerque, NM

U.S. Dept. of the Interior  
Bureau of Indian Affairs  
Billings, MT

## NEBRASKA STATE LEGISLATURE

The Honorable Chris Abboud  
The Honorable William Barrett  
The Honorable Chris Beutler  
The Honorable Emil E. Beyer, Jr.  
The Honorable Calvin F. Carsten  
The Honorable Ernie Chambers  
The Honorable Harry B. Chronister  
The Honorable Robert L. Clark  
The Honorable Sam Cullen  
The Honorable John DeCamp  
The Honorable Donald Eret  
The Honorable Clarence Jacobson  
The Honorable Lowell C. Johnson  
The Honorable Rod Johnson  
The Honorable Vard R. Johnson  
The Honorable Martin F. Kahle  
The Honorable Karen Kilgarin  
The Honorable Bernice R. Labedz  
The Honorable Howard A. Lamb  
The Honorable Shirley Marsh  
The Honorable Gordon McDonald  
The Honorable Patricia Morehead  
The Honorable David R. Newell  
The Honorable William E. Nichol  
The Honorable James Pappas

The Honorable George Fenger  
The Honorable James E. Goll  
The Honorable Glenn A. Goodrich  
The Honorable Rex Haberman  
The Honorable Gary Hannibal  
The Honorable L. William Harris  
The Honorable Elroy M. Hefner  
The Honorable Marge Higgins  
The Honorable Peter Hoagland  
The Honorable David Landis  
The Honorable Ray Lundy  
The Honorable Howard L. Peterson  
The Honorable Richard Peterson  
The Honorable Carol McBride Pirsch  
The Honorable R. Wiley Remmers  
The Honorable Lee Rupp  
The Honorable Loran Schmit  
The Honorable Harold F. Sieck  
The Honorable Tom Vickers  
The Honorable Merle Von Minden  
The Honorable Donald L. Wagner  
The Honorable Jerome Warner  
The Honorable Donald Wesely  
The Honorable Steve Wiitala  
The Honorable Ronald Withem

## STATE OF NEBRASKA

Nebraska Adjutant General - Military Department  
Lincoln, NE

Nebraska Arts Council  
Omaha, NE

Nebraska Attorney General  
Lincoln, NE

Nebraska Auditor of Public Accounts  
Lincoln, NE

**STATE OF NEBRASKA (continued)**

**Nebraska Board of Educational Lands and Funds**  
Lincoln, NE

**Nebraska Brand Committee**  
Gering, NE

**Nebraska Commission on Criminal Justice and Law Enforcement**  
Lincoln, NE

**Nebraska Commission on the Status of Women**  
Lincoln, NE

**Nebraska Dept. of Administrative Services**  
Director's Office  
Lincoln, NE

**Nebraska Dept. of Aeronautics**  
Lincoln, NE

**Nebraska Dept. of Aging**  
Lincoln, NE

**Nebraska Dept. of Agriculture**  
Lincoln, NE

**Nebraska Dept. of Correctional Services**  
Lincoln, NE

**Nebraska Dept. of Economic Development**  
Lincoln, NE

**Nebraska Dept. of Economic Development**  
Scottsbluff, NE

**Nebraska Dept. of Education**  
Lincoln, NE

**Nebraska Dept. of Education**  
Rehabilitation Services  
Scottsbluff, NE

**Nebraska Dept. of Environmental Control**  
Lincoln, NE

**Nebraska Dept. of Health**  
Lincoln, NE

**Nebraska Dept. of Health**  
Western Regional Health Department  
Scottsbluff, NE



**STATE OF NEBRASKA (continued)**

**Nebraska Dept. of Labor  
CETA Regional Office  
Scottsbluff, NE**

**Nebraska Dept. of Labor  
Lincoln, NE**

**Nebraska Dept. of Labor  
Scottsbluff Job Service  
Scottsbluff, NE**

**Nebraska Dept. of Labor  
Special Grants Division  
Lincoln, NE**

**Nebraska Dept. of Motor Vehicles  
Lincoln, NE**

**Nebraska Dept. of Public Institutions  
Lincoln, NE**

**Nebraska Dept. of Public Institutions  
Rehabilitation Services for Visually Impaired  
Scottsbluff, NE**

**Nebraska Dept. of Public Welfare  
Lincoln, NE**

**Nebraska Dept. of Public Welfare  
Scottsbluff, NE**

**Nebraska Dept. of Revenue  
Lincoln, NE**

**Nebraska Dept. of Revenue  
Scottsbluff, NE**

**Nebraska Dept. of Roads  
District V  
Bridgeport, NE**

**Nebraska Dept. of Roads  
Lincoln, NE**

**Nebraska Dept. of Water Resources  
Lincoln, NE**

**Nebraska Equal Opportunity Commission  
Scottsbluff, NE**

**STATE OF NEBRASKA (continued)**

**Nebraska Game and Parks Commission  
District I  
Alliance, NE**

**Nebraska Game and Parks Commission  
Lincoln, NE**

**Nebraska High Plains Development  
Sidney, NE**

**Nebraska Historical Society  
Lincoln, NE**

**Nebraska Library Commission  
Lincoln, NE**

**Nebraska Library Commission  
Panhandle Library System  
Scottsbluff, NE**

**Nebraska Lieutenant Governor  
Lincoln, NE**

**Nebraska Liquor Control Commission  
Lincoln, NE**

**Nebraska Mexican-American Commission  
Lincoln, NE**

**Nebraska Mexican-American Commission  
Scottsbluff, NE**

**Nebraska Natural Resources Commission  
Lincoln, NE**

**Nebraska Natural Resources District - North Platte  
Gering, NE**

**Nebraska Natural Resources District - South Platte  
Sidney, NE**

**Nebraska Oil and Gas Commission  
Sidney, NE**

**Nebraska Policy Research Office  
Lincoln, NE**

**Nebraska Public Service Commission  
Lincoln, NE**

**Nebraska Secretary of State  
Lincoln, NE**

**STATE OF NEBRASKA (continued)**

**Nebraska State College System  
Lincoln, NE**

**Nebraska State Court Administrator  
Lincoln, NE**

**Nebraska State Energy Office  
Lincoln, NE**

**Nebraska State Fire Marshall  
Lincoln, NE**

**Nebraska State Patrol  
Lincoln, NE**

**Nebraska State Patrol  
Scottsbluff, NE**

**Nebraska State Probation Administration  
District 10  
Gering, NE**

**Nebraska State Probation Administration  
Lincoln, NE**

**Nebraska State Treasurer  
Lincoln, NE**

**Nebraska Workman's Compensation Court  
Lincoln, NE**

**Panhandle Resource Council  
Scottsbluff, NE**

**University of Nebraska  
Conservation and Survey Division  
Lincoln, NE**

**University of Nebraska  
Conservation and Survey Division  
Scottsbluff, NE**

## **STATE OF WYOMING**

**Wyoming Adjutant General  
Cheyenne, WY**

**Wyoming Attorney General's Office  
Cheyenne, WY**

**Wyoming Dept. of Administration and Fiscal Control  
Budget Division  
Cheyenne, WY**

**Wyoming Dept. of Administration and Fiscal Control  
Division of Research and Statistics  
Cheyenne, WY**

**Wyoming Dept. of Agriculture  
Cheyenne, WY**

**Wyoming Dept. of Disaster and Civil Defense  
Cheyenne, WY**

**Wyoming Dept. of Economic Planning and Development  
Cheyenne, WY**

**Wyoming Dept. of Education  
Cheyenne, WY**

**Wyoming Dept. of Education  
Advisory Council for Vocational Education  
Cheyenne, WY**

**Wyoming Dept. of Education  
Division of Vocational Rehabilitation  
Cheyenne, WY**

**Wyoming Dept. of Environmental Quality  
Cheyenne, WY**

**Wyoming Dept. of Health and Social Services  
Cheyenne, WY**

**Wyoming Dept. of Health and Social Services  
Division of Community Programs  
Cheyenne, WY**

**Wyoming Dept. of Health and Social Services  
Division of Health and Medical Services  
Cheyenne, WY**

**Wyoming Dept. of Health and Social Services  
Division of Public Assistance and Social Services  
Cheyenne, WY**

**STATE OF WYOMING (continued)**

**Wyoming Dept. of Labor and Statistics  
Cheyenne, WY**

**Wyoming Dept. of Revenue and Taxation  
State Tax Commission  
Cheyenne, WY**

**Wyoming Division of Manpower Planning  
Cheyenne, WY**

**Wyoming Employment Security Commission  
Job Service of Wyoming  
Cheyenne, WY**

**Wyoming Game and Fish Department  
Cheyenne, WY**

**Wyoming Geological Survey  
Laramie, WY**

**Wyoming Highway Department  
Cheyenne, WY**

**Wyoming Industrial Siting Administration  
Cheyenne, WY**

**Wyoming Oil and Gas Commission  
Casper, WY**

**Wyoming Public Lands Department  
Cheyenne, WY**

**Wyoming Public Service Commission  
Cheyenne, WY**

**Wyoming Recreation Commission  
Cheyenne, WY**

**Wyoming State Engineer  
Cheyenne, WY**

**Wyoming State Planning and Coordination  
State Planning Coordinator's Office  
Cheyenne, WY**

**Wyoming Water Development Commission  
Cheyenne, WY**

## COUNTIES

Albany County Clerk  
Laramie, WY

Albany County Board of Commissioners  
Laramie, WY

Banner County Clerk  
Potter, NE

Banner County Board of Commissioners  
Potter, NE

Cheyenne County Clerk  
Sidney, NE

Goshen County Clerk  
Torrington, WY

Goshen County Board of Commissioners  
Torrington, WY

Morrill County Clerk  
Bridgeport, NE

Platte County Clerk  
Wheatland, WY

Platte County Board of Commissioners  
Wheatland, WY

Kimball County Clerk  
Kimball, NE

Kimball County Board of  
Commissioners  
Kimball, NE

Larimer County Clerk  
Ft. Collins, CO

Laramie County Clerk  
Cheyenne, WY

Laramie County Board of  
Commissioners  
Cheyenne, WY

Logan County Clerk  
Sterling, CO

Scotts Bluff County Clerk  
Gering, NE

Scotts Bluff County Board of  
Commissioners  
Gering, NE

Weld County Clerk  
Greeley, CO

## CITIES

Albin Town Clerk  
Albin, WY

Bayard City Clerk  
Bayard, NE

Bridgeport City Clerk  
Bridgeport, NE

Burns Town Clerk  
Burns, WY

Bushnell Village Clerk  
Bushnell, NE

Cheyenne City Clerk  
Cheyenne, WY

Greeley City Clerk  
Greeley, CO

Guernsey Town Clerk  
Guernsey, WY

Hartville Town Clerk  
Hartville, WY

Gering City Clerk  
Gering, NE

Gering City Administrator  
Gering, NE

Henry Village Clerk  
Henry, NE

**CITIES (continued)**

**Cheyenne Mayor's Office**  
**Cheyenne, WY**

**Cheyenne City Council**  
**Cheyenne, WY**

**Chugwater Town Clerk**  
**Chugwater, WY**

**Dalton Village Clerk**  
**Dalton, NE**

**Dix Village Clerk**  
**Dix, NE**

**Fort Collins City Clerk**  
**Fort Collins, CO**

**Fort Laramie Town Clerk**  
**Fort Laramie, WY**

**Glendo Town Clerk**  
**Glendo, WY**

**Lodgepole Village Clerk**  
**Lodgepole, NE**

**Lyman City Clerk**  
**Lyman, WY**

**McGrew Village Clerk**  
**McGrew, NE**

**Melbeta Village Clerk**  
**Melbeta, NE**

**Minatare City Clerk**  
**Minatare, NE**

**Mitchell City Clerk**  
**Mitchell, NE**

**Morrill Village Clerk**  
**Morrill, NE**

**Pine Bluffs Town Clerk**  
**Pine Bluffs, WY**

**Kimball City Administrator**  
**Kimball, NE**

**Kimball City Council**  
**Kimball, NE**

**Kimball City Clerk**  
**Kimball, NE**

**Kimball Mayor's Office**  
**Kimball, NE**

**LaGrange Town Clerk**  
**LaGrange, WY**

**Laramie City Clerk**  
**Laramie, WY**

**Laramie City Manager**  
**Laramie, WY**

**Lingle Town Clerk**  
**Lingle, WY**

**Scottsbluff City Clerk**  
**Scottsbluff, NE**

**Scottsbluff City Manager**  
**Scottsbluff, NE**

**Sidney City Clerk**  
**Sidney, NE**

**Terrytown Village Clerk**  
**Terrytown, NE**

**Torrington Town Clerk**  
**Torrington, WY**

**Torrington Mayor's Office**  
**Torrington, WY**

**Torrington Town Council**  
**Torrington, WY**

**Wheatland Town Clerk**  
**Wheatland, WY**

## **CITIES (continued)**

**Pine Bluffs Mayor's Office**  
**Pine Bluffs, WY**

**Pine Bluffs City Council**  
**Pine Bluffs, WY**

**Rock River Town Clerk**  
**Rock River, WY**

**Rock Springs City Clerk**  
**Rock Springs, WY**

**Wheatland Mayor's Office**  
**Wheatland, WY**

**Wheatland Town Council**  
**Wheatland, WY**

**Yoder Town Clerk**  
**Yoder, WY**

## **CITY OF CHEYENNE DEPARTMENTS**

**Accounting Department**

**Administrative Services**

**Airport Board**

**Attorney's Office**

**City Courts**

**Engineering Department**

**Fire Department**

**Housing Authority**

**Police Department**

**Planning Office**

**Recreation Department**

**Sanitation Department**

**Street and Alley Department**

**Traffic Department**

**Water Department**

**Weed and Pest Control**

**Youth Alternatives**

## **LARAMIE COUNTY DEPARTMENTS**

**Ambulance Board**

**City-County Health Unit**

**Civil Defense Agency**

**County Attorney**

**County Courts**

**County Engineer**

**District Court**

**Environmental Engineer**

**Fire District No. 1**

**Fire District No. 2**

**Fire Warden**

**Health Planning Committee**

**Hospital Board**

**Sheriff's Department**



**CITY OF CHEYENNE MAYOR'S IMPACT TEAM SUBCOMMITTEES**

**Impact Team Chairman**

**Budget & Finance Subcommittee**

**Civil Defense Subcommittee**

**Coping Mechanisms Subcommittee**

**Economic Subcommittee**

**Employment-Training-Manpower Subcommittee**

**Health Care Facilities & Services Subcommittee**

**Heritage, Values & Well Being Subcommittee**

**Housing Subcommittee**

**Intergovernmental Subcommittee**

**Land Use Subcommittee**

**Public Information Subcommittee**

**Public Services Subcommittee**

**Public Works Subcommittee**

**Recreation Subcommittee**

**Schools-General Education Subcommittee**

**Social & Helping Services Subcommittee**

**Transportation Subcommittee**

**Utilities Subcommittee**

**Water & Sewer Subcommittee**

**LIBRARIES: UNIVERSITIES, STATE & LOCAL**

**STATE**

**Nebraska State Library**  
Lincoln, NE

**Wyoming State Library**  
Cheyenne, WY

**Colorado State Library**  
Denver, CO

**COLLEGES/UNIVERSITIES**

**Casper College**  
Casper, WY

**Central Wyoming College**  
Riverton, WY

**Chadron State College**  
Chadron, NE

**Colorado State University**  
Fort Collins, CO

**Creighton University**  
Omaha, NE

**Eastern Wyoming College**  
Torrington, WY

**Kearney State College**  
Kearney, NE

**Laramie County Community College**  
Cheyenne, WY

**Nebraska Wesleyan University**  
Lincoln, NE

**Nebraska Western College**  
Scottsbluff, NE

**Northern Wyoming Community College**  
Sheridan, WY

**Northwest Community College**  
Powell, WY

**South Dakota State University**  
Brookings, SD

**Southeast Community College**  
Lincoln, NE

**University of Colorado**  
Boulder, CO

**University of Nebraska**  
Lincoln, NE

**University of Wyoming**  
Laramie, WY

**Wayne State College**  
Wayne, NE

**Western Wyoming Community College**  
Rock Springs, WY

**Union College**  
Lincoln, NE

## LOCAL

Albany County Public Library  
Laramie, WY

Banner County Library  
Harrisburg, NE

Gering City Library  
Gering, NE

Goshen County Library  
Torrington, WY

Kimball City Library  
Kimball, NE

Laramie County Public Library  
Cheyenne, WY

Laramie County Public Library  
Burns Branch Library  
Burns, WY

Lincoln City Library  
Lincoln, NE

Lyman Public Library  
Lyman, NE

Mitchell Public Library  
Mitchell, NE

Minatare Public Library  
Minatare, NE

Morrill Public Library  
Morrill, NE

Platte County Public Library  
Wheatland, WY

Scottsbluff Public Library  
Scottsbluff, NE

Scotts Bluff County Library  
Gering, NE

## CITIZENS' GROUPS/ORGANIZATIONS

Albany County Nuclear Freeze  
Campaign  
Laramie, WY

All-American Solidarity  
Cheyenne, WY

American Legion and Auxiliary  
Kankakee, Illinois

American Legion Dept. of Wyoming  
Cheyenne, WY

Committee on Defense Alternatives  
Sheridan, WY

Common Cause  
Denver, CO

The Conservation Foundation  
Washington, DC

Environmental Action Foundation  
Washington, DC

Environmental Policy Center/  
Environmental Policy Institute  
Washington, DC

Friends of the Earth  
San Francisco, CA

Friends of the Earth  
Washington, DC

Izaak Walton League of America, Inc.  
Nebraska Division  
Columbus, NE

Izaak Walton League of America, Inc.  
Wyoming Division  
Casper, WY

League of Women Voters  
Washington, DC

National Audubon Society  
New York, NY

## **CITIZENS' GROUPS/ORGANIZATIONS (continued)**

**National Audubon Society**  
Manhattan, KS

**Tri-State MX Coalition**  
Cheyenne, WY

**National Audubon Society**  
Boulder, CO

**Trout Unlimited Wyoming Chapter**  
Cheyenne, WY

**Nebraska Association of Resource  
Districts**  
Wakefield, NE

**University of Wyoming Nuclear Club**  
Laramie, WY

**Nebraska Bass Chapter Federation**  
Lincoln, NE

**Western Solidarity**  
Denver, CO

**Nebraska Nuclear Weapons Freeze  
Campaign**  
Lincoln, NE

**Wildlife Society**  
Kearney, NE

**Nebraskans Opposed to MX**  
Scottsbluff, NE

**Wildlife Society Wyoming Chapter**  
Sheridan, WY

**Nebraska Ornithologists Union**  
Lincoln, NE

**Wyoming Association of Conservation  
Districts**  
Baggs, WY

**Nebraska Wildlife Federation**  
Lincoln, NE

**Wyoming Church Coalition**  
Casper, WY

**Powder River Basin Resource Council**  
Sheridan, WY

**Wyoming Nuclear Weapons Freeze  
Coalition**  
Laramie, WY

**Save America Now**  
Sidney, NE

**Wyoming Outdoor Council, Inc.**  
Cheyenne, WY

**Sierra Club**  
Lander, WY

**Wyoming Wildlife Federation**  
Cheyenne, WY

**Sierra Club**  
Omaha, NE

## **INDIVIDUALS WHO SUBMITTED WRITTEN COMMENTS DURING SCOPING**

**Mary Ackerman**  
Ft. Collins, CO

**Lt. Col. J. E. Buist**  
Lincoln, NE

**Carol Ackerson**  
Torrington, WY

**Mrs. Florence Buredon**  
Torrington, WY

**Given Anderson**  
Ft. Collins, CO

**Mary Ann Buscay**  
Wheatland, WY

**Sharon Breitweiser**  
Laramie, WY

**Andrea L. Cook**  
Cheyenne, WY

**INDIVIDUALS WHO SUBMITTED WRITTEN COMMENTS  
DURING SCOPING (continued)**

**Richard Deyo  
Ft. Collins, CO**

**Betty Jean Dower  
Wheatland, WY**

**G.J. Edwards  
Cheyenne, WY**

**Joel Engelhardt  
Greeley, CO**

**Mayor Don Erickson  
Cheyenne, WY**

**Kathleen Glatz  
Chardon, NE**

**James L. Green  
Alliance, NE**

**Mayor Edith Haines  
Kimball, NE**

**Gwynne Hallock  
Ft. Collins, CO**

**Elwood & Myra Hanna  
Wheatland, WY**

**Elizabeth Marsh Jensen  
La Grange, WY**

**Kathie Joyner  
Laramie, WY**

**John Kefalas  
Ft. Collins, CO**

**Ernie Kittell  
Wheatland, WY**

**Louis Leichtweis  
Cheyenne, WY**

**Marian Lenzen  
Sidney, NE**

**Mark Lindenmeyer  
Ft. Collins, CO**

**Don Mai  
Harrisburg, NE**

**Mary Lou Marcum  
Cheyenne, WY**

**Prudy S. Marshall, PhD  
Cheyenne, WY**

**David McGuire  
Laramie, WY**

**Vivian J. McMullen  
Ft. Collins, CO**

**Lenore P. Miles  
Kimball, NE**

**Paul A. Moyer  
Timnath, CO**

**Diona Savoy-Marcus  
Wheatland, WY**

**Herman Noe  
Cheyenne, WY**

**Garry L. Oliver  
Laramie, WY**

**Lee A. Otto  
Yoder, WY**

**Nellie Red Owl  
Badland, SD**

**Major W. F. Palmer  
North Platte, NE**

**The Planning Studio  
Cheyenne, WY**

**Melon Roberts  
Dix, NE**

**Paul R. Ross  
Laramie, WY**

**Sister Frances Russell  
Cheyenne, WY**

**INDIVIDUALS WHO SUBMITTED WRITTEN COMMENTS  
DURING SCOPING (continued)**

**Doris Stansbury  
Cheyenne, WY**

**Kathleen Talgoom  
Green River, WY**

**Lloyd Sisson  
Pine Bluffs, WY**

**Joann Tall  
Porcupine, SD**

**Eric L. Snook  
Chadron, NE**

**Francis Towner  
Scottsbluff, NE**

**Janet L. Synder  
Denver, CO**

**Upland Industries Corp.  
Omaha, NE**

**Joe Stern  
Ft. Collins, CO**

**Susan Webster  
Ft. Collins, CO**

**Tim Strand, O.D.  
Cheyenne, WY**

#### **4.3.2      Additional Requests for DEIS**

During the DEIS public review and comment period a number of requests were received for copies of the DEIS. All persons/agencies who did not receive a copy of the DEIS at the time it was first made available, but received a copy in response to their request, are listed below.

##### **STATE DELEGATIONS**

###### **Colorado Delegation**

Honorable Gary Hart  
United States Senate

Honorable William L. Armstrong  
United States Senate

Honorable Hank Brown  
House of Representatives

Honorable Dan L. Schaefer  
House of Representatives

Honorable Patricia Schroeder  
House of Representatives

Honorable Timothy Wirth  
House of Representatives

Honorable Ray Kogovsek  
House of Representatives

Honorable Ken Kramer  
House of Representatives

##### **GOVERNMENTAL AGENCIES**

Advisory Council on Historic  
Preservation  
Golden, CO

Colorado State Clearinghouse  
Denver, CO

Denver Public Library  
Denver, CO

Small Business Administration  
Office of Policy, Planning and  
Budgeting  
Washington, DC

U.S. Department of Agriculture  
Farmers Home Administration  
Washington, DC

U.S. Department of Commerce  
Economic Development Administration  
Washington, DC

U.S. Department of Energy  
Office of Intergovernmental Affairs  
Washington, DC

U.S. Department of Health and Human Services  
Division of Realty  
Washington, DC

U.S. Department of Housing and Urban  
Development  
Office of Program and Policy  
Development  
Washington, DC

U.S. Department of Labor  
Office of Strategic Planning and Policy  
Development  
Washington, DC

U.S. Department of Transportation  
Facilities Management Division  
Washington, DC

## **GOVERNMENTAL AGENCIES (continued)**

**U.S. Department of the Interior  
Policy, Budget, and Administration  
Washington, DC**

**U.S. General Services Administration  
FPRS, Office of Real Property  
Washington, DC**

**U.S. Office of Economic Adjustment  
Western Regional Office  
Seattle, WA**

**U.S. Office of Management and Budget  
Field Operations Branch  
Washington, DC**

**Wyoming State Archaeologist  
University of Wyoming Anthropology Department  
Laramie, WY**

## **ORGANIZATIONS**

**Aviation Week & Space Technology  
Magazine  
Los Angeles, CA**

**Casper Star Tribune  
Casper, WY**

**Citizens Alert  
Reno, NV**

**Citizens Alert  
Las Vegas, NV**

**Colorado Historical Society  
Denver, CO**

**Denver Post  
Denver, CO**

**Earth Technology Corporation  
Seattle, WA**

**Ertec Western Inc.  
Long Beach, CA**

**Fort Laramie National Historic Site  
Fort Laramie, WY**

**Greater Cheyenne Chamber of Commerce  
Cheyenne, WY**

**Nature Conservancy  
Helena, MT**

**Nature Conservancy  
Cheyenne, WY**

**Nature Conservancy  
Boulder, CO**

**NBC News  
Denver, CO**

**Northwest Community College  
Powell, WY**

**Nuclear Times  
New York, NY**

**Powder River Basin Resource Council  
Sheridan, WY**

**Powder River Basin Resource Council  
Cheyenne, WY**

**SANE  
Washington, DC**

**The Boeing Company  
Seattle, WA**



## **ORGANIZATIONS (continued)**

**Harrison Western Corporation**  
Golden, CO

**HDR**  
Santa Barbara, CA

**KDUH-TV4**  
Scottsbluff, NE

**Martin Marietta**  
Lakewood, CO

**Mitre Corporation**  
McLean, VA

**Mountain West Environmental Services**  
Cheyenne, WY

**MX Information Center**  
Salt Lake City, UT

**National Campaign to Stop the MX**  
Washington, DC

### **INDIVIDUALS**

**Steve Blackman**  
Salt Lake City, Ut

**Hank Borys**  
Salt Lake City, UT

**Jim W. Ellison**  
Gering, NE

**Steve Erickson**  
Murray, UT

**E.F. Evert**  
Park Ridge, IL

**Elizabeth A. Fahy**  
Santa Barbara, CA

**Amy Glassmeier**  
Kensington, CA

**Ruth Gotchall**  
Torrington, WY

**Joe Griggs**  
Baker, NV

**Union Pacific Railroad**  
Omaha, NE

**University of Northern Colorado**  
Greeley, CO

**University of Wyoming**  
Anthropology Dept.  
Laramie, WY

**Western Solidarity**  
Cheyenne, WY

**Wyoming Church Coalition**  
Cheyenne, WY

**Wyoming Education Association**  
Cheyenne, WY

**Wyoming Nuclear Weapons Freeze**  
Coalition  
Cheyenne, WY

**D.T. Hunter**  
Santa Barbara, CA

**Bishop Jones**  
Laramie, WY

**Dr. Katz**  
Salt Lake City, UT

**Leita Kingsland**  
Salt Lake City, UT

**Mae Kirkbride**  
Cheyenne, WY

**Janice Knoll**  
Manhattan, Beach, CA

**Eileen Lappe**  
Cheyenne, WY

**Ernest Montgomery**  
Ft. Collins, CO

**Marla Painter**  
Carson City, NV

**INDIVIDUALS (continued)**

**Keith Hadley**  
**Laramie, WY**

**Lynn Hamilton**  
**Salt Lake City, UT**

**David Hansen**  
**Meriden, WY**

**Charles Hardy**  
**Cheyenne, WY**

**Christopher Hinze**  
**Cheyenne, WY**

**Stan Holmes**  
**Salt Lake City, UT**

**Margery A. Hulburt**  
**Cheyenne, WY**

**Amy Seidle**  
**Amhearst, MA**

**Pat Sexton**  
**Salt Lake City, UT**

**Carol Simpson**  
**Cheyenne, WY**

**Thomas H. Slone**  
**Boulder, CO**

**Ron Tan**  
**Pacific Palisades, CA**

**Mary Wilham**  
**Helena, MT**

**Thomas J. Wolf**  
**Ft. Collins, CO**

#### **4.4      Public Review and Comment Period**

During the 45-day public review and comment period, public comments were requested to be sent to the Air Force Regional Civil Engineer Ballistic Missile Support Office at Norton Air Force Base, California. Public comments were also received at seven public hearings. These hearings were held approximately fifteen days after release of the DEIS, to provide the opportunity for the public to offer comments on the DEIS. The hearings were held in the communities directly impacted by the proposed action, on November 1 to 4, 1983 at the following locations:

November 1, 1983 8:00 PM	Community Center Pine Bluffs, Wyoming
November 2, 1983 3:00PM	Cheyenne Civic Center Cheyenne, Wyoming
November 2, 1983 8:00 PM	Cheyenne Civic Center Cheyenne, Wyoming
November 3, 1983 3:00 PM	Platte County Fair Grounds Wheatland, Wyoming
November 3, 1983 8:00 PM	Eastern Wyoming College Torrington, Wyoming
November 4, 1983 3:00 PM	Banner County School Harrisburg, Nebraska
November 4, 1983 8:00 PM	Kimball County High School Kimball, Nebraska

All comments received on the DEIS, whether written or verbal, have been addressed. Documentation of the public comments received is included in Volume II: Public Comment.

#### **4.5      FEIS Distribution**

After the FEIS was filed with the U.S. Environmental Protection Agency, it was distributed to the following:

- 1) Those who were sent a copy of the DEIS during the week of October 7, 1983 (Refer to Section 4.3.1);
- 2) Those who requested a copy of the DEIS during the public review and comment period (Refer to Section 4.3.2);
- 3) Those who submitted comments on the DEIS (Refer to Volume II, Sections 6.1 and 6.3.1); and
- 4) Those who registered to speak at the public hearings (Refer to Volume II, Section 6.4).

## **APPENDIX A**

### **GLOSSARY OF ACRONYMS**

AFB	Air Force Base
AFRCE	Air Force Regional Civil Engineer
AFRCE-BMS	Air Force Regional Civil Engineer - Ballistic Missile Support
AFSEM	Air Force Socioeconomic Evaluation Model
BLM	Bureau of Land Management
BMO	Ballistic Missile Office
BMS	Ballistic Missile Support
CFR	Code of Federal Regulations
COMECA	Cooperative Ministries for Emergency Assistance
DEIS	Draft Environmental Impact Statement
DoD	United States Department of Defense
EIAP	Environmental Impact Analysis Process
EIS	Environmental Impact Statement
EPA	United States Environmental Protection Agency
EPTR	Environmental Planning Technical Report
FAA	Federal Aviation Administration
FEIS	Final Environmental Impact Statement
FY	Fiscal Year
LEIS	Legislative Environmental Impact Statement
LPN	Licensed Practical Nurse
M-X	Missile Experimental
RN	Registered Nurse
SCS	Soil Conservation Service, U.S. Department of Agriculture
USAF	United States Air Force
USDA	United States Department of Agriculture
USGS	United States Geological Survey

## **APPENDIX B**

### **GLOSSARY**

#### **B.1      Terms**

**Acre-Foot**: the volume of water that would cover 1 acre to a depth of 1 foot.

**Active Fault**: a fault along which there is recurrent movement, which is usually indicated by small periodic displacements or seismic activity.

**Activity Day**: a single occurrence of a recreational activity lasting for any period of time up to 12 hours; for example, one fishing visit of 8 hours duration would count as 1 fishing activity day, as would a visit of 2 hours duration.

**Ad Valorem Tax**: a tax imposed at a rate percent of the value of goods.

**Advisory Council On Historic Preservation**: Nineteen-member body appointed in part by the President of the United States to advise the President and Congress and to coordinate the actions of federal agencies on matters relating to historic preservation, to comment on the effects of such action on cultural resources, and to perform other duties as required by law (P.L. 89-655; 16 U.S.C.470, as amended).

**Aggregate**: any of several hard, inert materials, such as sand, gravel, slag, or crushed stone, used for mixing with a cementing material to form concrete, mortar, or plaster; or used alone, as in road-base or graded fill.

**Age Cohort**: a population group distinguished by age.

**Agricultural Conversion**: the change of land use from agricultural to some other form of land use.

**Algorithm**: a fixed step-by-step procedure for accomplishing a given result.

**Alluvium**: sediments deposited by a stream or running water.

**Altithermal**: a post-glacial period of generally warmer than normal temperatures and less than average rainfall dating approximately from 7500 5000 years before present.

**Ambient Air Quality Standards**: standards established on a state or federal level which define the ceiling height for allowable ambient air quality concentrations for the designated criteria pollutants: NO<sub>2</sub>, SO<sub>2</sub>, CO, O<sub>3</sub>, Pb, HC, and TSP.

**American Indians**: used in a collective sense to refer to all the peoples native to the North American continent, usually excluding Eskimos and Aleuts.

**Ancillary Facilities:** sites and structures associated with construction or operation of the project, but located outside of the Area of Concentrated Study. Included are power lines, rock quarries, and access roads.

**Animal Unit Month (AUM):** food requirements for a 1,000 pound cow for 1 month.

**Annexation:** a legal procedure, usually described in state statutes, followed by towns and cities when expanding their boundaries.

**Annual Average Daily Traffic:** traffic volume count.

**Annual Average Weekday Traffic:** denotes that the specified period includes only weekdays, Monday through Friday.

**Anthropology:** in a general sense, the scientific study of the human organism and its behavior.

**Aquifer:** the water-bearing portion of subsurface earth materials that yields or is capable of yielding useful quantities of water to wells.

**Aquitard:** a confining bed that retards but does not prevent the flow of water to or from an adjacent aquifer.

**Arch:** a broad, open anticlinal fold on a regional scale.

**Archaeology:** a scientific approach to the study of human ecology, culture history, and cultural process emphasizing systematic interpretation of material remains.

**Archaic Period/Tradition:** in the Great Plains, a period of time characterized by hunting and gathering subsistence patterns; the development of barbed and stemmed projectile points for use on spears, grinding and milling stones for food preparation, and ground and polished stone tools for everyday use; and the adoption of a seasonally migratory life-style. Sites associated with this period usually date to 7500 -1500 years before present.

**Area of Concentrated Study (ACS):** area(s) within the Region of Influence which will receive the majority of environmental impacts. Analysis of existing environmental conditions are described for, and impacts are focused within, the Area of Concentrated Study for this EIS. An ACS is defined for each environmental resource.

**Area Source:** pollution emissions from a spatial surface or area (e.g., dust from a tilled field).

**Artifact:** anything that owes its shape, form, or placement to human activity. Archaeological studies generally restrict use of the term to portable objects such as tools and discrete nonportable items (features) such as housepits, fire hearths, cairns, or buildings.

**Artifact Predation:** intentional or unintentional removal of an artifact or feature from an historic or prehistoric site.

**Assemblage:** the sum total of items produced by a particular culture; also used to refer to a group of items produced by a particular technology (usually called an "industry").

**Assessed Valuation:** a certain percentage of the value of a home set by the local government and used for tax purposes; in Cheyenne and Laramie County, 25 percent of the 1967 full value of the home.

**At-Grade Road:** a roadway surface at the same elevation as surrounding land, rather than on an elevated or depressed right-of-way.

**Atmospheric Dispersion:** the transport and mixing of gases or suspended particles in the atmosphere by winds and turbulent processes.

**Attainment Area:** an area that has been designated by the U.S. Environmental Protection Agency (EPA) and the appropriate state air quality agency as having ambient air quality levels below the ceiling levels defined under the National Ambient Air Quality Standards (NAAQS).

**Attitude:** a mental position with regard to a tenet or body of tenets.

**Average Cost Analysis:** a method of determining the financial impacts associated with construction of projects on a government entity wherein patterns of historical per capita expenditures and revenue generation are analyzed.

**Average Daily Traffic (ADT):** the average number of vehicles passing a specified point during a 24-hour period.

**Baseline:** the existing characterization of an area under no-project conditions.

**Base Metal:** any of the more common and more chemically active metals, e.g., lead and copper.

**Behavioral Norms:** principles of right action for members of a group serving as guides to proper manners of conduct.

**Belief:** mental acceptance of a tenet or body of tenets.

**Big Game Critical-Winter-Yearlong Habitat:** critical habitats are areas that determine an animal population's status and potential for growth and usually provide food, water, and cover even during severe weather. Winter-yearlong habitat is occupied by animals during more than one season, but most important to the herd during winter.

**Big Game Winter-Yearlong Habitat:** habitat occupied by animals during more than one season, but most important to the herd during winter.

**Big Game Yearlong Habitat:** includes areas where all or part of a herd is found throughout the year.

**Biochemical Oxygen Demand (BOD):** the amount of dissolved oxygen, in milligrams per liter, used by microorganisms in the biochemical oxidation of organic matter.

**Biota:** all of the organisms of an area; the flora and fauna of a region.

**Birth Rate:** births as a percentage of the total population.

**BOD<sub>5</sub> or 5-Day Biochemical Oxygen Demand:** the quantity of oxygen, in milligrams per liter, used by microorganisms in the biochemical oxidation of organic matter during a 5-day period at 20° C.

**Boomtown:** a town in which there is rapid, widespread expansion of economic activity.

**Breaks (Noun):** terrain characterized by abrupt changes in surface slope (e.g., in a line of cliffs and associated spurs and small ravines).

**British Thermal Unit (Btu):** the amount of heat required to raise the temperature of 1 pound of water by 1 degree Fahrenheit, at 60° F.

**Calving Grounds:** specific areas, identified by state management agencies, which are traditionally used by elk or moose to give birth to calves. These areas are used because of specific habitat characteristics such as cover or food supply.

**Campsite:** a habitation site exhibiting a weakly developed midden deposit.

**Candidate Species (also candidate threatened or endangered species):** taxa (species or subspecies) of plants and animals currently being considered for listing by the U.S. Fish and Wildlife Service.

**Capacity:** in transportation studies, the maximum number of vehicles having a reasonable expectation of passing over a given section of a lane or a roadway in one direction (or in both directions for a two-lane or a three-lane highway) during a given time period under prevailing roadway and traffic conditions.

**CAPDET:** a computer simulation and cost analysis model promulgated by the EPA and the U.S. Army Corps of Engineers for the determination of needed capacity and for the estimation of costs for various waste treatment processes.

**Capital Improvement Plan or Program:** a plan or program that forecasts or anticipates the timing and costs of expenditures for major equipment, facilities, or projects. Generally, the plan establishes a 5-year program with a yearly priority allocation of projects and expenditures and yearly review and update.

**Cartesian Coordinates:** coordinates that locate a point on a plane by its measured distance from two straight-line axes which intersect each other at right angles.

**Category One Species:** taxa for which the U.S. Fish and Wildlife Service has sufficient information on hand to support the biological appropriateness of their being listed as endangered or threatened species.

**Category Two Species:** taxa for which information now in the possession of the U.S. Fish and Wildlife Service indicates the probable appropriateness of citing as endangered or threatened, but for which sufficient information is not available to support a proposed rule with biological evidence.

**Cenozoic:** an era in geological history extending from the beginning of the Tertiary period, 67 million years ago, to the present time, characterized by the rapid evolution of mammals, birds, grasses, shrubs, and higher flowering plants.

**Center Pivot Irrigation:** an irrigation system which utilizes a framework of sprinkler heads anchored at one end and propelled in a circle by water pressure.

**Ceramic Period:** that period of time from approximately 1500 to 150 years before present in the central and western plains region characterized by the occurrence of ceramics; roughly corresponding to the Late Prehistoric period on the Northwestern Plains.



**Cheyenne Urban Area:** includes Cheyenne Census Division, F.E. Warren AFB, and urban fringe parts of Cheyenne East and West Divisions. Derived for analytical purposes by URS-Berger.

**Cheyenne Urbanized Area:** the City of Cheyenne and the adjacent densely settled area of Laramie County. By Bureau of the Census definition, an urbanized area comprises an incorporated area and the adjacent surrounding densely-settled area that together have a minimum population of 50,000.

**Chinook:** a warm dry wind undergoing adiabatic processes that descends the eastern slopes of the Rocky Mountains.

**Chronology:** the science of arranging time in periods and ascertaining the dates and historical order of past events.

**Clearwell:** a storage tank or tanks for filtered water at a water treatment plant, normally located adjacent to the filter units. Typically the clearwell provides detention time to allow injected chlorine to disinfect the water.

**Climate:** the prevalent or characteristic meteorological conditions, and their extremes, of any given location or region.

**Climatology:** the science that deals with climates and their phenomena.

**Codominant Vegetation Types:** vegetation cover with two plant species of equal dominance.

**Combustion Turbine:** directly fired turbine of the gas turbine type.

**Complex:** a group of related traits or characteristics that combine to form a complete activity, process, or culture unit. Lithic complexes are identified by the presence of several key implements or tool types in association.

**Comprehensive Plan:** a public document, usually consisting of maps, text, and supporting materials, adopted and approved by a local government or legislative body, which describes future land uses proposed within that government's jurisdiction along with goals and objectives.

**Contact Basin:** a tank within a water or waste treatment process in which coagulation/flocculation or other chemical or biochemical reactions are designed to occur.

**Contrast:** the effect of a striking difference in form, line, color, or texture of a landscape's features.

**Cooling Degree-Day:** a degree elevation in the mean outdoor temperature above 75° F averaged over a 24-hour period.

**Corridor:** a strip of land of various widths described on both sides of a particular linear facility such as a highway or transmission line.

**Count (Traffic):** a number of moving vehicles, which may be used for comparison with the present traffic volume assigned to the corresponding link. The count may be directional or total two-way, peak hour - morning and/or afternoon -and/or a 24-hour value.

**Cretaceous:** the last period of the Mesozoic era, extending between 144 and 66 million years ago.

**Critical Intersections:** roadway intersections classified as level of service E (highly congested) where there is a potential for exceeding the carbon monoxide ambient air quality standards from vehicular emissions.

**Crude Birth Rate:** number of live births per 1,000 population.

**Crystalline Rock:** a rock consisting wholly of crystals or fragments of crystals.

**CT Scan:** X-ray medical equipment capable of photographing cross sections of internal body parts.

**Cultural Continuity:** the retention of traditional roles, statuses, and identities through time by a specific cultural group, often occurring in spite of the addition of foreign language proficiency and the adoption of modern technological skills and innovations.

**Cultural Modification:** any manmade change in land, water forms, or vegetation (roads, bridges, buildings, fences); the addition of structures which create a visual contrast to the natural character of the landscape. A negative cultural modification is disharmonious with the existing scenery. A positive cultural modification can actually complement and improve a particular scene by adding variety or harmony.

**Cultural Resource:** any building, site, district, structure, object, data, or other material significant in history, architecture, archaeology, or culture.

**Cultural Resources Reconnaissance:** a literature search and records-review, plus an on-the-ground surface examination of selected portions of the area to be affected, adequate to assess the general nature of the resources probably present and the probable impact of a project.

**Cultural Resources Survey:** an intensive, on-the-ground survey and testing of an area sufficient to permit determination of the number and extent of the resources present, their scientific importance, and the time factors and costs of preserving, recovering, or otherwise mitigating adverse effects on them.

**Cultural Sequence:** an archaeologically distinct segment of a region's cultural history.

**Culture:** broadly, the system of behavior, beliefs, institutions, and objects that human social groups use to cope with the environment.

**Culture History:** an aspect of archaeology in which archaeological data are organized to produce a historical sequence for an area. The culture historian seeks to determine the historical order and nature of cultural changes within a geographical area of study.

**Cumulative Effects:** the aggregation of project-induced effects within the project's Region of Influence. The term cumulative has also been used to denote aggregated effects over several years as against net effects in a given year.

**Debitage:** lithic debris produced in tool manufacture.

**Debt Service:** a scheduled repayment of amortized debt usually resulting from the sale of bonds.

**Decibel (dB):** a logarithmic unit of measure of sound pressure level used to describe the loudness of sound. When used to correspond to the human range of hearing, decibels are weighted on an A-scale and expressed as dBA.

Decommissioning: removal of Minuteman III missiles for purpose of replacement by Peacekeeper missiles.

Degree Day, Heating: a unit, based upon temperature difference and time, used in estimating fuel consumption and specifying nominal heating load of a building in winter. For any one day, when the mean temperature is less than 18.3° C (65° F), there are as many Degree Days as degrees Celsius (Fahrenheit) difference in temperature between the mean temperature for the day and 18.3° C (65° F).

Design Life: the anticipated useful life of a facility.

Designated Wilderness Area: a tract of land that has been approved congressionally for incorporation into the National Wilderness Preservation System as mandated by the Wilderness Act of 1964.

Deterministic Process: a process in which there is or is assumed to be an exact mathematical relationship between the independent and dependent variables in the system.

Developed: a lot, parcel, or area which has been built upon or has had public services installed preparatory to development.

Diagnostic Artifact: a sufficiently distinct artifact feature or type that can be placed into an existing cultural tradition.

Digester Performance: the rate or amount of volume reduction achieved by biological treatment of waste sludge.

Direct Effects: effects resulting solely from project implementation.

Disinfection: the use of ultraviolet light or chemical or gaseous agents for the destruction of bacteria and viruses that cause waterborne diseases in man.

Displacement: movement from one's usual place of residence as a result of external circumstances.

Distance Zones: areas of landscape denoted by specified distances from an observation point or observer.

Disturbed Area: that specific land which has had its surface altered by grading, digging, or other activities related to construction.

Diurnal Temperature Ranges: the daily range of temperature extremes, (highest, lowest) for any designated seasonal period or period of study.

Divide: the ridge marking the boundary between two adjacent drainage basins or dividing the surface waters that flow naturally in one direction from those that flow in the opposite direction.

Divorce Rate: number of divorces per 1,000 population.

Dolomite: a variety of limestone or marble rich in magnesium carbonate.

Dry Cropland: land devoted to the production of crops without the need for irrigation.

**Earthquake:** a sudden motion or trembling in the earth caused by the abrupt release of accumulated strain.

**Easement:** the right to pass over property owned by another party: right-of-way.

**Ecology:** the study of the interrelationships of organisms both with their environment and with each other.

**Econometrics:** the application of economic theory and statistical procedures to observed data to 1) estimate the degree of influence of one variable on another, and 2) forecast endogenous variables from equations that quantify the interrelationships among the variables.

**Economies of Scale:** the decreases in an entity's long-run average costs that occur when it moves toward a specialization of resources, efficient utilization of equipment and manpower, or a lowering of unit costs of inputs.

**Ecosystem:** a group of plants and animals, including their environment, arranged in a trophic structure and participating in energy flow nutrient cycling.

**Edaphic:** of or relating to the soil.

**Effect:** a change in an attribute. Effects can be caused by a variety of events, including those that result from project attributes acting on the resource attribute (direct effect); those that do not result directly from the action or from the attributes of other resources acting on the attribute being studied; those that result from attributes of other projects or other attributes that change due to other projects (cumulative effects); and those that result from natural causes (e.g., seasonal change).

**Effluent:** wastewater discharged from a wastewater treatment facility.

**Emergency Medical Care:** services provided on an outpatient basis to victims of sudden illness, injury, or accident.

**Emission Factor:** the rate at which a pollutant is emitted from a point, line, or area source.

**Endangered Species:** a species that is threatened with extinction throughout all or a significant portion of its range.

**Endemic Species:** a species whose natural distribution is confined to a specific locality, area, or region.

**Endogenous Variables:** variables whose values are determined completely from the exogenous or other endogenous variables in a model or system of equations.

**Energy:** the capacity for doing work; taking a number of forms which may be transformed from one into another, such as thermal (heat mechanical work), electrical, and chemical; in customary units, measured in kilowatt hours (kWh) or British thermal units (Btu).

**Environment:** the sum total or the resultant of all the external conditions which act upon an organism.

**Enterprise Authority:** a governmental function established to be self-supporting in expenditure commitments and in generating revenues.

**Ephemeral Stream:** a stream that flows briefly only in response to precipitation in the immediate vicinity and whose channel is at all times above the water table.

**Equivalent Sound Level ( $L_{eq}$ ):** the level of a constant sound which, in a given situation and time period, has the same sound energy as does a time-varying sound. Technically, equivalent sound level is the level of the time-weighted, mean square, A-weighted sound pressure. The time interval over which the measurement is taken should always be specified.

**Estimation Equation:** an equation that yields an estimated value for the dependent variable given values for one or more independent variables that are thought to affect the dependent variable.

**Ethnographic Research:** the detailed, first-hand, systematic collection of facts about a contemporary social unit, usually a small-scale society or culture; used to produce a descriptive case study.

**Ethnography:** the description of human groups and their behavior by direct observation and/or by transcription of statements from living persons.

**Ethnohistory:** history of nonliterate human groups consisting of oral literature or ethnographic records.

**Ethnology:** a branch of anthropology dealing with extant races and cultures ("peoples").

**Exogenous Variables:** variables whose values are independently measured or are assumed in the forecasting of values for the endogenous variables. Exogenous variables are variables whose values are determined outside the model or system of equations under consideration.

**Expenditure:** a disbursement of funds by a government entity.

**Extended (Long-term) Care:** care at nursing homes and other long-term care facilities.

**Fault:** a fracture or zone of fractures along which there has been movement of the sides relative to one another parallel to the fracture.

**Fault System:** two or more interrelated fault zones.

**Fault Tree Analysis:** method of analysis for determining functional failures which can cause an undesired event in a system. The first step is definition and/or identification of an undescribed, undesired event or potential accident. The system is then analyzed for all logical combinations of functional failures which can lead to the undesired event.

**Fault Zone:** a fault that is expressed as a zone of numerous small fractures.

**Fauna:** animals; organisms of the animal kingdom of a given area taken collectively.

**Fawning Grounds:** specific areas, identified by state management agencies, which are traditionally used by deer or pronghorn to give birth to fawns or kids. These areas are used because of specific habitat characteristics such as cover or food supply.

**Fecal Coliform Bacteria:** a group of organisms found in the intestinal tracts of people and animals. Their presence in water indicates the likelihood of pollution and possibly dangerous bacterial contamination.

**Feral:** refers to a domestic animal that has become wild.

**Firefighting Vehicles:** vehicles directly used in fire suppression excluding ambulances, equipment vans, and vehicles used solely to transport personnel.

**Flake:** any piece of stone purposefully removed from a larger stone.

**Flat Yard:** a type of railroad yard where cars are switched and sorted or classified on level ground.

**Flights:** an irregular polygon circumscribed around 10 missile silos that are treated as a unit.

**Floodplain:** for inland waters, the area subject to a 1 percent or greater chance of flooding in any given year (i.e., the area adjacent to a stream expected to be inundated in a 100-year flood). Executive order 11988, Floodplain Management, places limitations on the construction of projects in floodplains and promulgates guidelines to ensure public health and safety both to protect against property loss and to protect natural and beneficial values of floodplains.

**Flora:** plants; organisms of the plant kingdom taken collectively.

**Fold:** a curve or bend in rock strata.

**Forage:** plant material which can be grazed or cut for hay and used as feed by domestic animals.

**Form:** the mass or shape of an object which appears unified; often defined by edge, outline, and surrounding space.

**Formation:** a lithologically distinct, mappable, rock body.

**Frictional Vacancy:** those housing units on the market that have been sold or rented but are awaiting occupancy.

**Fringe Area:** that unincorporated area adjacent to Cheyenne containing residential and nonresidential uses similar in character to the incorporated portions of Cheyenne.

**F Statistic:** a statistical measure used to judge the significance of a difference in two values or results.

**Fugitive Dust Emissions:** emissions released directly into the atmosphere that could not reasonably pass through a stack, chimney, vent, or other functionally equivalent opening.

**Furbearers:** mammal species that are harvested by trappers - such as muskrat, raccoon, or beaver.

**Gallinaceous Birds:** birds of the order Galliformes. Includes pheasant, grouse, and quail.

**Game Fish:** fish species generally found on the higher end of the food chain and considered sport fishes by anglers.

**Gaussian Diffusion:** the dispersion of a plume from its centerline corresponding to a normal distribution (bell-shaped).

**Geologic Hazard:** a naturally occurring or manmade geologic condition or phenomenon that presents a risk or is a potential danger to life and property.

**Geometric Mean:** the nth root of the product of n numbers.

**General Acute Care:** inpatient treatment provided in short-stay hospitals, according to a plan of care established by a physician. Acute care hospital services normally provided are medical-surgical, intensive care, intensive cardiac care or coronary care, obstetric-gynecological, neonatal special care, perinatal, pediatric, psychiatric, emergency, and organized outpatient.

**Geochronology:** that branch of geology specializing in the dating of specific geological events.

**Geothermal:** pertaining to the heat of the interior of the earth.

**Gravity Model:** a system of equations which balances the gravity, or size, of a community with its proximity to a work site.

**Growth Management:** the philosophy of using land development controls (regulations, plans, and policies) to influence the rate, direction, and quality of growth and development within a governmental jurisdiction.

**Habitat - Big Game Critical-Winter-Yearlong:** critical habitats are areas that determine an animal population's status and potential for growth and usually provide food, water, and cover even during severe weather. Winter-yearlong habitat is occupied by animals during more than one season, but most important to the herd during winter.

**Habitat - Big Game Winter-Yearlong:** habitat occupied by animals during more than one season, but most important to the herd during winter.

**Habitat - Big Game Yearlong:** includes areas where all or part of a herd is found throughout the year.

**Habitats:** places or physical areas with particular kinds of environments in which organisms live.

**Habitation Site:** a location bearing evidence of prehistoric human occupation (e.g., a village or campsite) and distinguished by developed midden deposits.

**Harmony:** the combination of parts into a pleasing or orderly whole; congruity; a state of agreement or proportionate arrangement of form, line, color, and texture.

**Hazard Control Analysis:** a continuous, iterative process whereby a system and its components are analyzed for potential hazards. Requirements to control these hazards are defined and then tracked through resolution. The hazards are then eliminated by design, procedural methods, or by use of warnings, safety devices, and precautions.

**Heating Degree-Day:** a degree declination in the mean outdoor temperature below 65° F (18.3° C) averaged over a 24-hour period.

**Heavy Duty Vehicles:** all vehicles having three or more axles and designated for the transportation of cargo. Generally, the gross vehicle weight is greater than 26,000 pounds.

**Heritage Values:** properties or qualities of an historic or archaeological locality, object, feature, structure, or district that give it importance or that make it eligible for inclusion in the National Register of Historic Places.

**Historic:** referring to a period of time after the advent of written history. In the Region of Influence the historic period ranges from about AD 1800 to the present. It also refers to items primarily of Euro-American manufacture.

**Historic District:** delineated area formally designated as containing specific important cultural resources.

**Holocene Epoch:** the time since the end of the Pleistocene, characterized by the absence of large continental or Cordilleran ice sheets and extinction of large mammalian life forms. Generally considered to be the last 10,000 years.

**Homogeneous:** of a uniform structure culturally or racially.

**Horizon (Cultural):** an archaeological manifestation of a particular time period, often used to refer to an occupational period at a site or groups of related sites.

**Household Size:** the average number of individuals residing in a single dwelling unit.

**Housing Market Mechanism:** the ability of the market to respond to an increase in demand for housing with an adequate housing supply.

**Hump Yard:** a type of railroad yard where cars are switched by passing over a rise in topography which gives them momentum to ride to different tracks.

**Hydrogeologic Unit:** one or more geologic formations with similar waterbearing and transmitting characteristics.

**Hypergolic:** a capacity of two compounds to ignite spontaneously when mixed.

**Impact:** an assessment of the meaning of changes in all attributes being studied for a given resource; an aggregation of all the effects, usually aggregated by a qualitative and subjective technique.

**Impoundment:** a manmade area for the detention or retention of surface water.

**Incorporated:** organized pursuant to the laws of the state, having an elected governing body; refers to a town or city.

**Indigent:** needy; destitute; in poverty.

**Indirect Effects:** effects resulting from the attributes of other resources acting on the attribute being studied. For example, direct project employees will spend some of their income locally. As a result, local industries will tend to hire more workers as they expand in response to the increased demand. This additional employment is termed an "indirect effect".

**Indirect Employment:** employment resulting from the purchases of workers who are directly working on a specified project. Indirect employment also includes any subsequent employment that may arise from the increase in output/purchases in the area.



**Induced Effects:** Refers to a tertiary level of demand change in the target economy resulting from direct and indirect effects.

**Induced Seismic Activity:** seismic activity which is either initiated or increased as a result of the nontectonic processes (i.e., fluid injection or withdrawal or reservoir loading).

**Industry-Specific Location Coefficient:** ratio of the share of earnings for a specific sector in region to the share of earnings for that sector nationally.

**Infill:** the process of encouraging development of vacant lands which have been bypassed during the growth of a city and are now surrounded by development.

**Infiltration:** the leakage of groundwater into a sewer from defective or deteriorating pipe joints.

**Inflow:** the entrance of stormwater runoff into a sanitary sewer through defective or deteriorating manhole structures or via the illicit connection of roof drains or street storm drains to sanitary sewers.

**Infrastructure:** the system of public utility lines, communication facility networks, and roadways which connect all the structures and facilities in a given locale.

**Inmigrants:** all people relocating into a defined geographic area, usually calculated on an annual basis.

**Input/Output Model:** an analytical method which disaggregates the economy into industrial sectors tracing the flow of goods and services among these sectors to indicate the systematic relations among them.

**Intercontinental Ballistic Missile (ICBM):** a large land-based missile capable of accurate delivery over intercontinental ranges (usually greater than 5,000 miles).

**Intermittent Stream:** a stream that does not have continuous flow during all periods of the year.

**Inversion:** a reversal of the normal atmospheric temperature gradient, causing increasing temperatures with height.

**Investor-Owned Utility:** utility owned by private investors as contrasted to utilities owned by federal, state, or local governments or cooperatives owned by consumers.

**Irrigated Cropland:** land devoted to the production of crops which require and benefit from periodic supplemental moisture other than natural precipitation.

**Kill Site:** archaeological site indicated by the presence or association of faunal remains, butchering tools, and hunting equipment such as projectile points.

**Labor Market Friction:** that component of the labor force which is unable to find employment due to time lags between job opening and job findings, but is otherwise employable.

**Lacking complete plumbing for exclusive use:** includes those conditions when 1) all three specified plumbing facilities are present within the unit but are also used by another household; 2) some but not all facilities are present; or 3) none of the three specified plumbing facilities is present.

**Lambing Grounds:** specific areas, identified by state management agencies, which are traditionally utilized by bighorn sheep to give birth to lambs. These areas are used because of specific habitat characteristics such as cover or food supply.

**Landowner:** a person or entity indicated as the owner of property on the various ownership maps maintained by the Office of the County Assessor.

**LANDSAT:** an unmanned earth-orbiting NASA satellite that transmits multi-spectral images to earth receiving stations.

**Landslide:** the downslope movement of soil and rock material en masse, under gravitational influence.

**Land Use (Subsistence)/Settlement Pattern:** characteristic distributions of artifacts at habitation sites occupied by members of a particular society which show the relationship between specific activity areas within a residence or community.

**Ldn Noise Level:** the 24-hour average-energy sound level expressed in decibels, with a 10-decibel penalty added to sound levels between 10 PM and 7 AM.

**Leq Noise Level:** a constant amount of acoustic energy equivalent to the energy contained in the time-varying noise measured from a given source for a given time. It is expressed in dBA.

**Leakage Parameters:** those portions of salary and wages which are not spent within the region. These include taxes, savings, and other expenditures made elsewhere.

**Level of Impact:** for each environmental resource and its elements, there are specific definitions for negligible, low, moderate, and high impacts for this EIS.

**Level of Service:** in transportation studies, a qualitative measure of the flow of traffic along a given road in consideration of a wide variety of factors, including speed and travel time, traffic interruptions, and freedom to maneuver. Levels of service are designated A through F - A being a free-flow condition with low volumes and high speeds, and F being a congested condition of low speeds and stop-and-go traffic. Intermediate levels describe conditions between these extremes.

**Light-Duty Vehicles:** automobiles and light trucks with two axles and four wheels, designed primarily for transportation of nine or fewer passengers (automobiles) or for transportation of cargo (light trucks). Generally, the weight is less than 10,000 pounds.

**Lignite:** a brownish-black coal that is intermediate in coalification between peat and subbituminous coal.

**Limestone:** a sedimentary rock consisting chiefly of calcium carbonate.

**Line:** the path that the eye follows when perceiving abrupt differences in form, color, or texture. In the landscape, ridges, skylines, structures, changes in vegetation, or individual trees and branches may be perceived as a line.

**Liquefaction:** in cohesionless soil, the transformation from a solid to a liquid state as a result of increased pore pressure and reduced effective stress.

**Lithic Debris:** the waste material produced in the manufacture of stone tools; chips. Also, debitage and detritus.

**Location Quotient:** the ratio of the share of earnings for a specific sector in a region to the share of earnings for that sector nationally. Alternatively, sectoral employment may be used as the basis for measurement.

**Long Term:** denotes the steady-state operations phase of the project when a constant level of project employment is attained.

**Long-Term Impact:** after the construction phase and during full operation, an impact occurring after 1990.

**Lot:** a parcel of land created by and identified in a subdivision.

**Magnitude (earthquake):** a measure of the strength of an earthquake or the strain energy released by it.

**Mean:** a value that is computed by dividing the sum of a set of terms by the number of terms (i.e., average).

**Median:** the midpoint of a distribution computed by adding the lowest and the highest values on a distribution and dividing by two.

**Memorandum of Agreement (Cultural Resources):** A duly executed contractual document that constitutes the comments of the Advisory Council on Historic Preservation regarding a proposed federal action, that evidences consideration by the lead federal agency of the effects of its action on cultural resources within a project's Region of Influence, and that sets forth the rights and responsibilities of the signatories.

**Mesozoic:** an era of geologic time extending from about 245 million to 66 million years ago.

**Metamorphic Rock:** a rock derived from preexisting rocks by changes from increased temperature, pressure, and the chemical environment, generally at depth in the earth's crust.

**Meteorology:** the scientific study of the atmosphere.

**Microenvironment:** the environmental conditions actually experienced by an organism in its environment. Examples of microenvironments with very different environmental conditions within the same locale would be a burrow, the area under a rock, a shaded surface, and a sunny surface.

**Mill:** a rate of taxation expressed in one-tenth of a cent.

**Milligram:** one-thousandth of a gram.

**Millimeter:** one-thousandth of a meter.

**Miocene:** an epoch of the Tertiary period, 24 to 5 million years ago, marked by the development of apes and appearance of ancestral gibbons.

**Mitigations:** methods to reduce or eliminate adverse project impacts.

**Mixing Height:** the height of the atmospheric layer in which convection and mechanical turbulence promote mixing.

**ML:** local Richter earthquake magnitude. A measure of the strain energy released by an earthquake within 100 kilometers of the epicenter.

**Mobile Home:** a dwelling unit which is transportable in one or more sections, built on a permanent chassis, and designed to be used with or without a permanent foundation. Does not include travel trailers or recreational vehicles.

**Mobile Source:** mobile air pollution sources are comprised of all air, water and land transportation vehicles.

**Model:** a mathematical formula that expresses the actions and interactions of the elements of a system in such a manner that the system may be evaluated under any given set of conditions; i.e., groundwater, erosion-sedimentation, air quality, and water quality.

**Modified Mercalli Intensity:** an arbitrary measure of an earthquake's intensity based on the effect on people and structures. Ranges from I (not felt by people) to XII (damage nearly total).

**Mortality/Morbidity:** incidence of death/disease for a given population; key health status and indicators.

**Multifamily Housing:** townhouse or apartment units which accommodate more than one family although each dwelling unit is occupied by only one household.

**Multiplier:** a numerical factor that relates economic quantities.

**(National) Historic Landmark:** a property possessing exceptional value as commemorating or illustrating the history of the United States. Landmark designation is reserved for those properties which by strength and clarity of historical association, architectural or design excellence, or extraordinary information content are, or clearly have the potential to be, publicly and professionally recognized, understood, and appreciated for their significance to the nation as a whole.

**National Register of Historic Places (NRHP):** a register of districts, sites, buildings, structures, and objects significant in American history, architecture, archaeology, and culture, maintained by the Secretary of the Interior under authority of Section 2(b) of the Historic Sites Act of 1935 and Section 101(a) (1) of the National Historic Preservation Act.

**Net Demand:** total demand less net vacancy.

**Net Vacancy:** overall vacancy minus frictional vacancy.

**"Nonfirm" Power:** electric power supplied under a contract which allows the supplier to cut off supply at his option when demands on his system exceed his capacity. This type of contract may be offered by a generator with a large hydroelectric capacity which is subject to water shortages during periods of low precipitation.

**Nonfranchised Local Operations:** privately owned local hotels and motels that are not members of a regional or national chain.

**Noise Contour:** a line connecting all points having the same value; e.g., a 65 -decibel A-weighted (dBA) contour.

**Noise Sensitive Areas:** specific locations (or general areas) of types of land-use activities that may be affected by traffic noise.

**Nonattainment Area:** an area that has been designated by the U.S. Environmental Protection Agency (EPA) and the appropriate state air quality agency as exceeding one or more National Ambient Air Quality Standards (NAAQS).

**Noncompliance:** action contradicting a specified procedure or causing results outside specified limits.

**Nongame Fish:** fish species generally found near the lower end of the food chain and not considered sport fishes by anglers.

**Open Camp:** habitation site exhibiting a weakly developed midden deposit with no evidence of structures.

**Operating Costs:** costs incurred in operating a government entity.

**Outside Economy:** that economy which is outside the boundary of the economy under study.

**Overall Vacancy:** total number of single family, multifamily, or mobile homes that are unoccupied at any given time.

**Paleo-:** prefix denoting "past" or "extinct."

**Paleo-Indian:** earliest documented hunting and gathering groups in North America, generally dating from 12,000 to 6000 BC.

**Parcel:** a plot of land with definable boundaries which is not a lot.

**Parks Master Plan:** a planning document projecting future need for parks and other recreational facilities.

**Participation Day:** a single occurrence of a recreational activity lasting for any period of time up to 12 hours. Another term for activity day.

**Patient Origin:** the geographical, residential origins of patients admitted to hospitals for medical services. Same as the hospital's service area.

**Patrol Cars:** marked vehicles used in day-to-day patrol duties.

**Peak Flow:** the maximum discharge of a stream during a specified period of time.

**Peak Hour:** the 60 minutes observed during either the morning or evening peak traffic period that contains the largest amount of travel.

**Peak Period:** the two consecutive morning or evening 60-minute periods that collectively contain the maximum amount of morning or evening travel. Peak period can be associated with person-trip movement, vehicle-trip movement, or transit trips.

**Peak Year:** the year in which some particular project-related effect, e.g., total employment, is greatest.

**Per Capita Expenditures:** amount of expenditures in a given category calculated on a per person basis.

**Per Capita Personal Income:** average annual income per person (in a specified region).

**Per Capita Revenues:** amount of revenues in a given category calculated on a per person basis.

**Perennial Stream:** a stream that has continuous flow during all periods of the year.

**Peripheral Species:** a species whose distribution extends only into a small portion of the Region of Influence.

**Permeability:** the property or capacity of a porous rock, sediment, or soil for transmitting a fluid.

**Personal Income:** total annual income earned by individuals before taxes including interest income, transfer payments, and employee fringe benefits.

**Petroglyph:** schematic or representational art incised or pecked into a stationary rock surface.

**Physical Infrastructure:** capital facilities, such as roads and water and sewer lines.

**Physiographic Province:** a region of which all parts are similar in geologic structure and climate and which have consequently had a unified geomorphic history.

**Pictograph:** schematic or representational art painted or drawn onto a stationary rock surface.

**Plains Woodland Period/Tradition:** that period of time in the plains region from approximately 1500 to 950 years before present marked by the appearance of pottery and the first attempts at cultivation of crops in an area that had previously been a region of hunting and gathering complexes.

**Plat (Platted):** a map approved by a local governmental legislative body and officially recorded by the Office of the County Clerk and Recorder, which creates lots for sale and/or development; a lot or area included within a plat.

**Pleistocene:** an epoch of geological history from 1.6 million to 10,000 years ago, marked by repeated glaciation and the first indication of social life in human beings.

**Pliocene:** an epoch of the Tertiary period 5 to 1.6 million years ago, characterized by the development of the first man-like primates.

**Polar Coordinates:** coordinates that locate a point in space on a plane by its vector (direction and magnitude).

**Precious Metal:** a general term for gold, silver, or any of the minerals in the platinum group.

**Predictive Model:** a statement or set of statements which attempt to define the conditions surrounding the occurrence of a certain class of phenomena. For example, an archaeologist might predict that prehistoric settlements would tend to occur at stream confluences.

**Prehistoric:** that period of time prior to the written record; in the Region of Influence area, generally the prehistoric period before AD 1800.

**Preliminary Treatment:** the first processes at a wastewater treatment facility to remove coarse debris from wastewater. Typically, the treatment involves bar or mechanical screening, grit removal, and sometimes comminution.

**Preservation:** action taken to maintain physical integrity of cultural resource sites by limiting the effects of geological processes, human disturbance, and predation.

**Pressure Zone:** a water service area delineated by a range of water pressures at which water is delivered to a customer's connection point. Typically, pressure zone boundaries indicate areas with water pressure below 40 psi and above 100 psi.

**Prevention of Significant Deterioration (PSD):** air quality regulations intended to maintain air quality by regulating the amount of further deterioration. Land areas are designated as Class I, II, or III according to the amount of allowable further degradation.

**Primary Care:** basic, general care, usually provided in a physician's office, clinic, or ambulatory care center. Primary care physicians are general or family practice physicians, obstetricians, pediatricians, osteopaths, and internists. Other primary care personnel are nurses and public health nurses, nurse practitioners, and physician support personnel.

**Primary Impact:** impacts due to direct influences from project activities.

**Probability Analysis:** an analysis conducted to evaluate the chance that a given event will occur.

**Programmatic Memorandum Of Agreement:** a memorandum of agreement established to cover all phases of a complex or long-term proposed federal action or series of related actions, thereby obviating the need for a separate MOA for each individual phase or action.

**Projectile Point:** an implement which probably served as the tip of a dart, lance, spear, arrow, and other launched piercing tool (weapons).

**Protohistory:** that period in which nonliterate Native American cultures were affected by the Euro-Americans without direct contact. For instance, inland Indian tribes received trade goods and reports of the white cultures from other Indian tribes long before their arrival.

**Provenience Data:** information about the location of artifacts.

**PSD Class I Areas:** lands in which existing air quality is to be most stringently maintained.

**Qualitative Measures:** measures relating to inherent, intangible features that are hard to quantify.

**Quantitative Measures:** measures that assess the degree of association between variables.

**Quantity Distance:** the prescribed safety zone or required safe distance between places where explosives (including rocket propellants) are stored or processed, and other specified locations such as inhabited buildings, public traffic routes, recreational areas, utilities, petroleum storage facilities, and storage or processing facilities for other explosives.

**Quaternary:** geologic period of the Cenozoic era extending from about 1.6 million years ago to the present.

**Queue Length:** length of vehicles backed up at a signalized intersection during the red cycle period.

**Radiometric Dating:** calculating an age of years for geologic materials by measuring the presence of a short-life radioactive element.

**Rangeland:** that land which produces native vegetation suitable for grazing by livestock such as cattle, sheep, and horses.

**Raptors:** birds of prey, such as eagles, hawks, falcons, vultures, and owls.

**Rare Animal:** an animal species that occupies only a small percentage of the preferred habitat within its range, or a species that is found throughout its range in extremely low densities; cannot always be found by a skilled observer even during intensive survey work.

**Rational Medical Service Area:** national geographic area for delivery of primary medical care services as determined using federal (Public Health Service) criteria for designation of health manpower shortage areas (1980).

**Reclamation:** the process of restoration of an area which has been disturbed.

**Reconstruction:** the act or process of reproducing by new construction the exact form and detail of a vanished building, structure or object, or a part thereof, as it appeared in a specific period of time.

**Recreation Standard:** the standard used to project future recreation needs based on population.

**Recreational Vehicle:** a transportable vehicle designed to provide mobile, temporary living accommodations.

**Region of Influence:** the largest region which would be expected to receive measurable impacts from the Proposed Action.

**Rehabilitation:** the act or process of returning a property to a state of utility through repair or alteration which makes possible an efficient contemporary use while preserving these portions or features of the property which are significant to its historical, architectural and cultural values.

**Relief:** the vertical difference in elevation between the hilltops or mountains summits and the lowlands of a given region.

**Restoration:** the act or process of accurately recovering the form and details of a property and its setting as it appeared at a particular time by means of the removal of later work or by the replacement of missing earlier work.

**Revegetation:** regrowth or replacement of a plant community on a disturbed site. Revegetation may be assisted by site preparation, planting, and treatment, or it may occur naturally (secondary succession).

**Revenue:** the yield of sources of income that a government entity collects or receives.

**Riffles:** turbulent water resulting from a high rate of flow through a shallow area of a stream channel with a congregation of larger particles (boulders, gravel) in the substratum.



Riparian: pertaining to features on the bank of a natural water course.

Rock Shelter: naturally formed rock overhang exhibiting evidence of human occupation.

Rural: that area outside of towns, cities, or communities characterized by very low density housing concentrations, agricultural land uses, and general lack of most public services.

Rural Electric Association (REA): cooperative sponsored by the Rural Electrification Administration of the U.S. Department of Agriculture to supply electricity to a rural area.

Rural Subdivision: a platted area located away from an incorporated town or city, characterized by very low population densities, onsite wells for water supply, and septic systems.

Scenic Quality: a relative index of the visual distinctiveness of the landscape based on the diversity of form, line, color, and texture, including visual intrusions but excluding viewer sensitivity.

Secondary Impact: impacts due to indirect influence from project activities, i.e., transporting materials to project site.

Secondary Treatment: a waste treatment system in which biochemical oxygen demand in wastewater is reduced by aerated biological processes and sedimentation.

Section: a 1 square mile subdivision of a township.

Sediment: solid fragmental material that originates from weathering of rocks and is transported or deposited by air, water, or ice.

Seismic: pertaining to an earthquake or earth vibration, including those that are artificially induced.

Seismotectonic Province: a region which is characterized by similar tectonic and seismic characteristics.

Short-Term Impact: during the construction period; up to 1990.

Significance: the importance to the resource of the impact on the resource. Council of Environmental Quality (CEQ) regulations specify several tests to determine whether an action will significantly affect the quality of the human environment. While these tests apply to the entire action, they can also be used in amended form to judge impact significance for individual resources. It is important to note that a high impact may not be significant, while a low impact may. Significance is an either/or determination: the level of impact described either is significant or is not significant. Additionally, beneficial significance must be determined at the same level as adverse significance. As specified in the CEQ regulations, significance needs to be determined for each of three geographic areas: local, regional, and national. This places the impact into context. Significance is also determined in terms of intensity.

Site-Specific: characteristic of a geographically defined location that may vary considerably from characteristics of adjacent locations or the characteristics of a larger area within which the location in question is contained.

**Soil:** a natural body consisting of layers of mineral and/or organic constituents of variable thickness, which differ from the parent material in their morphological, physical, chemical, and mineralogical properties and their biological characteristics.

**Species of Special Concern:** species protected by state legislation and/or species identified by state agencies as requiring special attention due to limited distribution and/or population declines.

**Stability:** in relation to air pollution disciplines, the property of the atmosphere that causes it, when disturbed from a condition of equilibrium, to develop forces or movements that restore the original condition.

**State Historic Preservation Officer:** the official within each state, authorized by the state at the request of the Secretary of the Interior, to act as liaison for purposes of implementing the National Historic Preservation Act.

**Stabilization:** the act or process of applying measures to provide a weather-resistant enclosure and reestablish the structural stability of an unsafe or deteriorated property while maintaining the essential form as it exists at present.

**Storm Water Management Model(SWMM):** a computer model promulgated by the EPA for hydraulic and quality simulation of storm, sanitary, and combined sewers, treatment processes, and receiving waters; known as the SWMM model.

**Stratigraphy:** natural, often differing, deposits that have accumulated in one place over a period of time and now are layered in the earth's surface, the oldest deposits being the deepest. Cultural materials are dated relative to each other by their position in the stratigraphic layers.

**Subdivision:** an area of land for which a plat has been approved.

**Subdivision Moratorium:** an action by a local governmental legislative body which causes the creation and/or development of lots to cease until the moratorium is lifted.

**Subdivision Regulations:** a public document which establishes requirements for legally dividing land for sale or development.

**Sublimation:** an effect similar to evaporation, whereby a substance passes directly from a solid to gaseous phase. For example, snow or ice can sublime into the atmosphere without ever becoming liquid.

**Subsidence:** the sudden sinking or gradual downward settlement of the earth's surface with little or no horizontal motion.

**Substance Abuse:** the misuse of alcohol or other drugs.

**Surcharge:** the condition within a gravity sewer wherein flow changes from nonpressurized to pressurized flow. Typically this involves the water level rising above the top of a sewer line in manholes, sometimes causing flooding of streets above.

**Surface Roughness:** a measure of the irregularity of the terrain used to determine the extent of turbulent mixing near the land surface from a body of air passing over the terrain.

**Surplus Job-Seekers:** persons seeking employment in a given area in excess of employment demand.

**Sworn Officer:** a law enforcement official empowered to make arrests.

**Tectonics:** of or dealing with the broad architecture of the upper part of the earth's crust, i.e., the regional assembling of structural or deformational features, and their mutual relationships, origins, and historical evolution.

**Terrace:** a long, narrow relatively level or slightly inclined surface found flanking drainages at elevations above the floodplain. Represents an abandoned floodplain.

**Tertiary Care:** tertiary or specialty care services are those which require sophisticated equipment and specialized training, involve risks to the patient, and are rarely required, such as open heart surgery, radiation therapy, cardiac catheterization, computer tomographic scanning, and end-stage renal disease care.

**Texture:** the visual manifestation of the interplay of light and shadow created by variations in the surface of an object.

**Threatened Species:** a species that is likely to become endangered in the foreseeable future.

**Threshold Limit Value:** the maximum acceptable concentration for worker exposure to a potentially toxic material; determined on the basis of a 8-hour work day and 40-hour week.

**Tipi Ring/Stone Circle:** a circle of stones generally measuring from 3.5 meters to 7 meters in diameter that are thought to represent the remains of various types of structures, or to have served a religious function.

**Township:** a surveyed tract of land containing 36 sq mi and identified relative to its relationship to defined parallels of latitude.

**Transient:** a person passing through an area and staying for only a short period of time.

**Unavoidable Adverse Impact:** a project-induced effect determined to be adverse that cannot, and hence will not, be mitigated or avoided.

**Underutilization:** an overbuilt condition where demand is not strong enough to absorb developed land uses, particularly during the decline cycle of a project.

**Unincorporated:** not included within the corporate limits of a city or town.

**Union Catalog:** a listing of all books and/or periodicals available in a given library, library system, or other area.

**Upland Game:** hunted species other than big game or waterfowl, including gallinaceous birds, cottontails, and squirrels.

**Urban:** descriptive of an area within towns, cities, or communities characterized by densities greater than one dwelling unit per acre.

**Urban Fringe:** area associated with a city but beyond the municipal boundaries.

**Urban Service Area:** the areas in and immediately surrounding a city that are provided service amenities such as water and sewer.

**Use Tax:** a tax on construction materials purchased outside the taxing unit's jurisdiction but used within the unit's boundaries.

**Values:** the principles or qualities intrinsically desirable to a person or group of people.

**Variety:** the condition of having differentiated parts; the absence of monotony or sameness.

**Viewer Sensitivity:** a relative index of the sensitivity of a view area based on the number of viewers, purpose of observation, length of observation, and number of view points from which the view area can be seen.

**Viewshed:** the segment of landscape that is seen from an observation point or travel route.

**Visibility Degradation:** any adverse change in visibility consisting of either a reduction of visual range from some reference value, or a reduction in contrast between an object and the horizon sky, or a shift in coloration or light intensity of the sky or distant objects compared to what is perceived on a "clear day."

**Visitor Day:** one or more visits totaling a 12-hour day. For example, 1 fishing visit of 8 hours duration and another of 4 hours duration would equal 1 fishing visitor day.

**Visual Intrusion:** a man-caused alteration in the landscape that, due to the introduction of form, line, color, or texture and/or disproportionate scale, sequence or repetitions, introduces discord or discontinuity into the landscape, thereby reducing its visual quality.

**WATSIM:** a proprietary computer model, available under several lease agreements, for the simulation of water distribution pipe networks and storage volumes, plus appurtenances.

**Wedge-Out:** the edge or line of a pinch-out of lensing or truncated rock formation.

**Weighting Factors:** numerical weights ranging from one to ten, determined by judgment, used to increase or decrease the relative score of a particular impact category. The use of such factors is designed to emphasize important or sensitive issues in grading of impacts and ranking of sites.

**Wetlands:** areas defined by the prevailing vegetation types and soil moisture content and consisting of vegetation typical of soils that are saturated for a major portion of the year.

**Worst Case:** the combination of all the worst possible effects to result potentially from the actions of a project.

**Xeric:** characterized by or requiring only a small amount of moisture.

**Years Before Present (BP):** Dating terminology establishing the age of an object, material, structure, or burial in terms of the number of years prior to AD 1950.

## **B.2      Units of Measurements**

Btu	British thermal unit
cf	cubic feet
cy	cubic yard
dBA	decibels weighted on the A scale
kV	kilovolt
kVA	kilovolt amper
kW	kilowatt
kWh	kilowatt hour
L <sub>eq</sub>	timed averaged sound energy
L <sub>dn</sub>	day/night sound level
MCF	thousand cubic feet
MG	million gallons
MMCF	million cubic feet
mph	miles per hour
MW	megawatt
MWh	megawatt hour
ppm	parts per million
ug/m <sup>3</sup>	microgram per cubic meter
sq ft	square feet
sq mi	square mile

## **APPENDIX C**

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## APPENDIX D

### REFERENCES CITED

This section contains only works actually cited in the text of the FEIS. To see a complete listing of all works reviewed in its preparation, consult the references (Section 5.0) in the environmental planning technical reports for individual resources.

Algermissen, S.T., and D.M. Perkins

1976 A Probabilistic Estimate Maximum Acceleration in Rock in the Contiguous United States.  
U.S. Geological Survey Open File Report 76-416.

Algermissen, S.T., D.M. Perkins, P.C. Thenhaus, S.L. Hansen, and B.L. Bender

1982 Probabilistic Estimates of Maximum Acceleration and Velocity in Rock in the Contiguous United States. U.S. Geological Survey Open File Report 82-1033.

Anderson, Elaine

1974 A Survey of the Late Pleistocene and Holocene Mammal Fauna of Wyoming.  
In Applied Geology and Archaeology: The Holocene History of Wyoming, edited by Michael Wilson. Geological Survey of Wyoming, Report of Investigations 10:79-87.

Ashford, Norman and Paul H. Wright

1979 Airport Engineering. New York, New York.

Baker, Sweeney and Associates

1981 Report on the Sanitary Sewer System. Prepared for F.E. Warren AFB; Scottsbluff, Nebraska.

Banner Associates, Inc.

1982 201 Facilities Plan Final Report: City of Cheyenne, South Cheyenne Water & Sewer District, Laramie County. Laramie, Wyoming.

Banner Associates, Inc.

1983 Crow Creek Watershed Channel Characterization Study. Prepared for URS-Berger, Cheyenne.

Baxter, George T., and J.R. Simon

1970 Wyoming Fishes. Bulletin No. 4, Wyoming Game and Fish Department, Cheyenne.

Baxter, George T., and Michael D. Stone

1980 Amphibians and Reptiles of Wyoming. Bulletin No. 16, Wyoming Game and Fish Department, Cheyenne.

Bellrose, Frank C.

1980 Ducks, Geese, and Swans of North American (third ed.). Stackpole Books, Harrisburg, Pennsylvania.

Bolt, Beranek and Newman, Inc.

1975 Developing Noise Exposure Contours for General Aviation Airports. Report No. FAA-AS-75-1 and DOT-FA-75WA-3710, prepared by Dwight E. Bishop and Anthony P. Hayes for the Department of Transportation, Federal Aviation Administration, Canoga Park, California.

Branch, Kristy

1982 Community Research Working Paper: Douglas, Wyoming. BLM Social Effects Project.

Branch, Kristy, James Thompson, Jane Creighton, and Douglas A. Hopper

1982 Guide to Social Assessments. Report prepared for Social Effects Project of the Bureau of Land Management.

BRW/Noblitt, Inc.

1979 Cheyenne Municipal Airport Master Plan. Report prepared for Cheyenne Airport Board.

BRW/Noblitt, Inc., and Wright-McLaughlin Engineers

1979 Dry Creek Major Drainageway Planning (Vols. I and II). City of Cheyenne and Laramie County.

Carlson, Gayle F. and Terry L. Steinacher

1978 A Preliminary Culture-Historical Sequence for the Plains Archaic Period in Nebraska. Paper presented at the Symposium, Migration and Extinction in the Great Plains, Institute for Tertiary-Quaternary Studies, Lincoln.

Chase III, Charles A., Steven J. Bissel, Hugh E. Kingery, and Walter D. Gaul (ed.).

1982 Colorado Bird Distribution Latilong Study (2nd ed.). Colorado Field Ornithologists and Colorado Division of Wildlife, Denver.

Cheyenne Board of Public Utilities

1983a Personal communication with the staff.

Cheyenne Board of Public Utilities

1983b Water supply and water use records, unpublished, Cheyenne.

Cheyenne Light, Fuel and Power Company

1983 Personal communication with the Operations Manager.

Cheyenne Water Conservation Advisory Group

1982 Proposed Water Conservation Plan for the City of Cheyenne. Cheyenne.

Cluff, L.S., W.R. Hanse, C.L. Taylor, K.D. Waeaver, G.E. Borgan, I.M. Idriss, F.E. McClure, and J.A. Blayney.

1972 Site Evaluation in Seismically Active Regions - An Inter-disciplinary Team Approach. Proceedings: International Conference on Microzonation 2:957-987.

Code of Federal Regulations

1982 40CFR, Parts 81-99, P. 1, 1984, July. Office of National Archives, Washington, DC.

Colorado Department of Health

1982a Colorado Air Pollution Control Regulations.

Colorado Department of Health

1982b Colorado Air Quality Data Report, 1981. Air Pollution Control Division, Denver.

**Colorado Division of Wildlife**

1978a Colorado Small Game, Furbearer and Varmint Harvest 1977. Pittman-Robertson W-121-R, Denver.

**Colorado Division of Wildlife**

1978b Essential Habitat for Threatened or Endangered Wildlife in Colorado. Denver.

**Colorado Division of Wildlife**

1979 Colorado Small Game, Furbearer, and Varmint Harvest 1978. Pittman-Robertson W-121-R, Denver.

**Colorado Division of Wildlife**

1980 Colorado Small Game, Furbearer, and Varmint Harvest 1979. Pittman-Robertson W-121-R, Denver.

**Colorado Division of Wildlife**

1981 Colorado Small Game, Furbearer, and Varmint Harvest 1980. Pittman-Robertson W-121-R, Denver.

**Colorado Division of Wildlife**

1982 Colorado Small Game, Furbearer, and Varmint Harvest 1981. Pittman-Robertson W-121-R, Denver.

**Colorado Division of Wildlife**

n.d. Where and How to Hunt Ducks in Colorado. Denver.

**Colorado Natural Heritage Program**

1983 Personal communication with the staff.

**Cortese, Charles F.**

1977 The Sociological Analysis of Boom Towns. Western Sociological Review (Vol. B).

**Cortese, Charles F.**

1980 The Effects of Rapid Growth on Local Organization and Community Social Structure. Paper presented at the Western Rural Development Center Conference, Scottsdale, Arizona.

**Cortese, Charles F.**

1982 The Impacts of Rapid Growth on Local Organizations and Community Services. In Coping With Rapid Growth in Rural Communities, edited by Weber and Howell. Western Press, Boulder.

**Crist, M.A.**

1980 Effect of Pumpage on Groundwater Levels as Modeled in Laramie County. U.S. Geological Survey, Open File Report 80-1104.

**EPA (United States Environmental Protection Agency)**

1971 Noise from Construction Equipment and Operations, Building Equipment and Home Appliances. Prepared by Bolt, Beranek, and Newman, Inc., Cambridge, Massachusetts.

**EPA**

1973 Climatological Dispersion Model. EPA-R4-73-024.

EPA

1977 User's Manual for Single-Source (CRSTER) Model. EPA-450/2-27- 013, Research Triangle Park, North Carolina.

EPA

1979a Industrial Source Complex (ISC) Dispersion Model Short-Term (Vol. I). EPA-450/4-79-030.

EPA

1979b Protecting Visibility. An EPA Report to Congress, Strategies and Air Standards, EPA-450/5-79-008, Research Triangle Park, North Carolina.

EPA

1980a Prevention of Significant Deterioration Workshop Manual. Research Triangle Park, North Carolina.

EPA

1980b Workbook for Estimating Visibility Impairment. Office of Air Quality Planning and Standards, EPA-450/4-80-031, Research Triangle Park, North Carolina.

EPA

1981a Mobile Source Emissions Model. Motor Vehicle Emission Laboratory, EPA-460/3-81-006, Ann Arbor, Michigan.

EPA

1981b Compilation of Air Pollutant Emission Factors (including Supplements 1-12). AP-42 (third ed.), Research Triangle Park, North Carolina.

EPA

1982 Storm Water Management Model-User's Manual (Version III).

EPA

1983 EPA Annual Report. National Emission Data System, 1980, Computer listing issued through EPA Regional Offices.

Ertec Western, Inc.

1983 Peacekeeper Siting Investigation - Preliminary Water Supply Development Plans, Wyoming and Nebraska. Long Beach, California.

Federal Aviation Administration

1980 Ten Year Plan. Washington, DC.

Federal Emergency Management Agency

1982 Flood Hazard Boundary Maps. City of Cheyenne and Unincorporated Areas of Laramie County. Denver.

Federal Highway Administration

1978 Manual on Uniform Traffic Control Devices. Washington, DC.

Federal Highway Administration

1979 CALINE III - A Versatile Dispersion Model for Predicting Air Pollutant Levels Near Highway and Arterial Streets. Report No. FHWA/CA/TL-79/23.

**Federal Highway Administration**

1982 Noise Barrier Cost Reduction Procedure STAMINA 2.0/OPTIMA User's Manual.  
Arlington, Virginia.

**Federal Register**

1978 40CFR, Part 51, Requirements for Preparation, Adoption, and Submittal of Implementation Plans, Vol. 43, No. 118, p. 26,380, June 19.

**Federal Register**

1980 40CFR, Parts 51, 52, and 124, Requirements for Preparation, Adoption, and Submittal of Implementation Plans; Approval and Promulgation of Implementation Plans, p. 52,676, August 7.

**F.E. Warren AFB, Civil Engineering Office**

1983 Personal communication with the staff.

**F.E. Warren AFB, Fuel Allocation Office**

1983 Personal communication with the Director.

**Fly, C.L., K. Kennedy, and E.B. Jones**

1982 Wyoming Resources and Conservation Plans 1981-1985 and Beyond, Volume II Resource Conservation Accomplishments and Future Goals. State Conservation Commission of Wyoming.

**Flynn, C.B., and J.H. Flynn**

1982 The Group Ecology Method: A New Conceptual Design for Impact Assessment. IAIA Bulletin. 1,4: 11-19.

**Freudenburg, William R.**

1980 The Density of Acquaintanceship: Social Structure and Social Impacts in a Rocky Mountain Boomtown. Paper presented at the 1980 Annual Meeting of American Sociological Association.

**Freudenburg, William R.**

1982 The Impacts of Rapid Growth on the Social and Personal Well-Being of Local Community Residents, In Coping With Rapid Growth in Rural Communities edited by Weber and Howell. Westview Press, Boulder.

**Frison, George C.**

1978 Prehistoric Hunters of the High Plains. Academic Press, New York.

**Holzworth, G.C.**

1972 Mixing Heights, Wind Speeds, and Potential for Urban Air Pollution Throughout the Contiguous United States. No. AP-101, U.S. Environmental Protection Agency, Office of Air Programs, Research Triangle Park, North Carolina.

**Hosler, Charles R.**

1961 Low Level Inversion Frequency in the Contiguous United States. Monthly Weather Review Vol. 89, pp. 319-339.

**Howard, K.A., J.M. Aaron, E.E. Brabb, M.R. Brock, H.D. Gower, S.J. Hunt,**

**D.J. Milton, W.R. Muelberger, J.K. Nakata, G. Plafker, D.C. Prowell, R.E. Wallace, and I.J. Witkind.**

1978 Preliminary Map of Young Faults in the United States as a Guide to Possible Fault Activity. U.S. Geological Survey, Miscellaneous Field Studies, Map MF-916



Kansas/Nebraska Natural Gas Company  
1983 Personal communication with the Vice President.

Laycock, W.A.

1979 Introduction-Grassland Types. In Perspectives in Grassland Ecology edited by Norman French. Springer-Verlag, New York.

Leistritz, F. Larry and Karen C. Maki

1981 Socioeconomic Effects of Large-Scale Resource Development Projects in Rural Areas: The Case of McLean County, North Dakota. North Dakota State University, Fargo, North Dakota.

Liu, S.C. and N.J. De Capua

1975 Microzonation of Rocky Mountain States. Proceedings: U.S. National Conference on Earthquake Engineering pp. 128-135.

Lowham, H.W.

1976 Techniques for Estimating Flow Characteristics of Wyoming Streams. Water Resources Investigations pp. 76-112.

McConnell, Allan D., Lt Colonel, USAF, Cormier, George

1982 Minutes of Fish and Wildlife Committee Meeting, F.E. Warren AFB, November 5.

McGrew, L.W.

1962 Quaternary Faulting in Southeastern Wyoming. Unpublished work for the Geological Survey of Wyoming and the Department of Geology, University of Wyoming.

Mitchell, Jim

1978 Surveys and Management of Mourning Dove. Work Plan R-77, Pittman-Robertson W-15-R-34, March 1, 1977 to February 28, 1978, prepared for the Nebraska Game and Parks Commission, Lincoln.

Mitchell, Jim

1979 Surveys and Management of Mourning Dove. Work Plan R-78, Pittman-Robertson W-15-R-35, March 1, 1978 to February 28, 1979, prepared for the Nebraska Game and Parks Commission, Lincoln.

Mitchell, Jim

1980 Surveys and Management of Mourning Dove. Work Plan R-79, Pittman-Robertson W-15-R-36, March 1, 1979 to February 28, 1980, prepared for the Nebraska Game and Parks Commission, Lincoln.

Mitchell, Jim

1981 Mourning Dove Breeding Population Density Surveys, Harvest Surveys. Work Plan R-80, Pittman-Robertson W-15-R-37, March 1, 1980 to February 28, 1981, prepared for the Nebraska Game and Parks Commission, Lincoln.

Morris, Donald A. and Horace M. Babcock

1960 Geology and Groundwater Resources of Platte County, Wyoming.  
U.S. Geological Survey Water Supply Paper 1490.

Mountain Bell

1983 Personal communication with the Engineering Manager, Cheyenne.

Mulloy, William T.

1958 A Preliminary Historical Outline for the Northwestern Plains.  
University of Wyoming Publications in Science 22 (1): 1 - 235.

Murdock, Steven H. and Leistitz, Larry

1979 Energy Development in the Western United States. Praeger, New York.

National Earthquake Information Service (NEIS)

1982 Worldwide Earthquake Data Tape through May 1981, Boulder, Colorado.

Nebraska Department of Environmental Control

1982a Nebraska Air Pollution Control Rules and Regulations.

Nebraska Department of Environmental Control

1982b Nebraska Air Quality Report, 1981. Air Pollution Control Division, Lincoln.

Nebraska Department of Water Resources

1982 Forty-fourth Biennial Report of the Department of Water Resources to the Governor of Nebraska. Lincoln.

Nebraska Games and Parks Commission

1972 The Nebraska Fish and Wildlife Plan (Vol. 1). Nebraska Wildlife Resource Inventory, Lincoln.

Nebraska Game and Parks Commission

1983 Personal communication with the staff.

Newton, Ian

1979 Population Ecology of Raptors. Buteo Books, Vermillion, South Dakota.

Oakleaf, Bob, Helen Downing, Bert Raynes, Meg Raynes, and Oliver K. Scott

1982 Wyoming Avian Atlas. Wyoming Game and Fish Department, and Bighorn Audubon Society, Cheyenne.

Orgill, M.M., and G.A. Sehmel

1975 Frequency and Diurnal Variation of Dust in the Continental United States Pacific Northwest Laboratory Annual Report for 1975 to the U.S. Atomic Energy Commission, Division of Biomedical and Environmental Research, Part 3, Atmospheric Sciences, Richland, Washington.

Reagor, B.G., C.W. Stover, and S.T. Algermissen

1981 Seismicity Map, State of Nebraska. U.S. Geological Survey Miscellaneous Field Studies Map, MF-1350.

Reher, Charles A.

1971 A Survey of Ceramic Sites in Southeastern Wyoming. Unpublished M.A. thesis. Department of Anthropology, University of Wyoming, Laramie.

Reher, Charles A.

1982 Cultural Resources in Southeastern Wyoming: the ETSI Coal Slurry Pipeline Intertie Route. Report prepared for P-III Associates, Bechtel Group, Inc. and Energy Transportation Systems, Inc.

Simon, R.B.

1972 Geologic Atlas of the Rocky Mountain Region. Rocky Mountain Association of Geologists.

South Dakota Game, Fish and Parks Department

1983 Personal communication with staff.

Strickland, Dale

1979 Annual Report of Upland Game and Furbearer Harvest 1978. Project No. W-27-R-32. Wyoming Game and Fish Department, Cheyenne.

Strickland, Dale

1980 Annual Report of Upland Game and Furbearer Harvest 1979. Project No. W-27-R-33. Wyoming Game and Fish Department, Cheyenne.

Strickland, Dale

1981 Annual Report of Upland Game and Furbearer Harvest 1980. Project No. W-27-R-34. Wyoming Game and Fish Department, Cheyenne.

Strickland, Dale

1982 Annual Report of Upland Game and Furbearer Harvest 1981. Project No. W-27-R-35. Wyoming Game and Fish Department, Cheyenne.

USAF

1983 Personal communication with F.E. Warren AFB Game Warden.

Transportation Research Board

1965 Highway Capacity Manual. Washington, DC.

U.S. Bureau of Reclamation

1977 Groundwater Manual. U.S. Department of the Interior.

U.S. Department of Agriculture, Forest Service

1981 Cheyenne Stage II Water Diversion Proposal. Appendix, Draft Environmental Impact Statement, Laramie.

U.S. Department of Commerce (USDC)

1982 Local Climatological Data--Annual Summary with Comparative Data, for Cheyenne, Wyoming, 1981. National Climatic Data Center, Asheville, North Carolina.

U.S. Department of Housing and Urban Development

1979 Environmental Criteria and Standards. 24 CFR, Part 51, 14 July, Washington, DC.

U.S. Department of Housing and Urban Development

1979-1982 Community Development Block Grant Program Housing Assistance Plan, Survey of Housing Conditions. Cheyenne.

U.S. Environmental Protection Agency - see under EPA

U.S. Fish and Wildlife Service

1978a Stream Evaluation Map, State of Colorado. U.S. Fish and Wildlife Service, Billings.

U.S. Fish and Wildlife Service

1978b Stream Evaluation Map, State of Nebraska. U.S. Fish and Wildlife Service, Billings.

**U.S. Fish and Wildlife Service**

1978c Stream Evaluation Map, State of South Dakota. U.S. Fish and Wildlife Service, Billings.

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1978d Stream Evaluation Map, State of Wyoming. U.S. Fish and Wildlife Service, Billings.

**U.S. Fish and Wildlife Service**

1983 Personal communication with the staff, Denver.

**USGS (U.S. Geological Survey)**

1981 Missouri River Basin Water Year 1980 (Vol. 1). U.S. Geological Survey Water Data Report WY-80-1.

**USGS**

1982 Nebraska Water Year 1918. U.S. Geological Survey, Water Data Report NE-81-1.

**U.S. Soil Conservation Service**

1975a Users Manual, Computer Program for Project Formulation - Hydrology. Technical Release No. 20.

**U.S. Soil Conservation Service**

1975b Procedure For Computing Sheet and Rill Erosion on Project Areas. Technical Release No. 51. Washington, DC.

**U.S. Soil Conservation Service**

1975c Urban Hydrology for Small Watersheds. Technical Release No. 55.

**U.S. Soil Conservation Service**

1975d Soil Taxonomy: a Basic System of Soil Classification for Making and Interpreting Soil Surveys. U.S. Department of Agriculture Handbook 436.

**Weaver, J.E.**

1954 North American Prairie. Johnson Publishing Co., Lincoln, Nebraska.

**Weedon, Ronald R., and Donna Norton**

1982 Final Draft Report on Blowout Penstemon, a Rare Sandhill Endemic. Herbarium, Department of Biology, Chadron State College, Nebraska.

**Western Area Power Administration**

1983 Personal communication with the staff of the Director's Office, Power Resources Division.

**Wilkinson, Ken**

1982 BLM Social Effects Project Community Report: Craig, Colorado. Prepared by Mountain West Research - North, Inc. in association with Western Research Corporation, Billings, Montana.

**Wilson, Michael**

1974 History of the Bison in Wyoming, with Particular Reference to Early Holocene Forms. In Applied Geology and Archaeology: The Holocene History of Wyoming, edited by Michael Wilson. Geological Survey of Wyoming, Report of Investigations 10:91-99.

Wood, John J.

1967 Archaeological Investigations in Northeastern Colorado.

Ph.D. dissertation, University of Colorado, Boulder. University Microfilms, Ann Arbor.

**Wyle Laboratories**

1973 Assessment of Noise Environments Around Railroad Operations. Wyle Laboratories Report WCR 73-5, prepared for Southern Pacific Transportation Company, Union Pacific Railroad, the Atchinson, Topeka and Santa Fe Railway Company, and the Association of American Railroads, El Segundo, California.

**Wyoming Department of Environmental Quality**

1979 Guideline For Fugitive Dust Emission Factors For Mining Activities. Cheyenne.

**Wyoming Department of Environmental Quality**

1982a Air Quality Standards and Regulations. Cheyenne.

**Wyoming Department of Environmental Quality**

1982b Wyoming's Air Quality-Ambient Air Monitoring Data: 1981. Air Quality Division, Cheyenne.

**Wyoming Department of Environmental Quality**

1983 Computer Tape of Climatological Dispersion Model, including Wyoming Department of Environmental Quality's modifications.

**Wyoming Engineer's Office**

1983 Personal communication with staff.

**Wyoming Game and Fish Department**

1972 Current Status and Inventory Waterfowl for Central and Pacific Flyways. Planning Report No. 96 Wyoming Game and Fish Department.

**Wyoming Game and Fish Department**

1977 Current Status and Inventory of Wildlife in Wyoming. Cheyenne.

**Wyoming Game and Fish Department**

1979a Map: Seasonal Habitat for Mule Deer, Cheyenne. 1:500,000, District 5, Cheyenne.

**Wyoming Game and Fish Department**

1979b Map: Seasonal Habitat for Mule Deer, Goshen Hole. 1:500,000, District 5, Cheyenne.

**Wyoming Game and Fish Department**

1980a Map: Seasonal Habitat for Mule Deer from Iron Mountain. 1:500,000, District 5, Cheyenne.

**Wyoming Game and Fish Department**

1980b Map: Seasonal Habitat for White-tailed Deer, Southeast Wyoming. 1:500,000, District 5, Cheyenne.

**Wyoming Game and Fish Department**

1982a Map: Seasonal Habitat for Elk Iron Mountain. 1:500,000, District 5, Cheyenne.

**Wyoming Game and Fish Department**

1982b Map: Seasonal Habitat for Pronghorn, Iron Mountain. 1:500,000, District 5, Cheyenne.

Wyoming Game and Fish Department  
1982c 1982 Annual Report. Cheyenne.

Wyoming Game and Fish Department  
1983a Wildlife Observation System Printout, Cheyenne.

Wyoming Game and Fish Department  
1983b Lake and Stream Survey Reporting and Numbering System. Cheyenne.

Wyoming Game and Fish Department  
1983c Personal communication with the staff.

Wyoming Game and Fish Department  
n.d.-a A Strategic Plan for the Comprehensive Management of Wildlife 1978-1983, Vol. II.  
Cheyenne.

Wyoming Game and Fish Department  
n.d.-b Map: Seasonal Habitat for Pronghorn, Hawk Springs. 1:500,000, District 5, Cheyenne.

Wyoming Game and Fish Department  
n.d.-c Map: Seasonal Habitat for White-tailed Deer, Laramie River. 1:500,000, District 5,  
Cheyenne.

Wyoming Natural Heritage Program  
1983 Computer Listing of Rare and Endangered Species and Natural Areas of Albany, Carbon,  
Converse, Goshen, Laramie, Niobrara, and Platte Counties, Cheyenne.

Wyoming Natural Heritage Program  
1983 Personal communication with the staff.

Wyoming, University of  
1982 Draft Vegetation Maps. Wyoming Cooperative Research Unit 1982, 1:500,000 Prepared  
for the U.S. Fish and Wildlife Service, Laramie.

## APPENDIX E

### AUTHORIZING ACTIONS

The following list includes permits or consultations which must be completed before or during construction of the Peacekeeper in Minuteman Silos project.

Other applicable federal or state laws that do not specifically require a permit or consultation are not listed here; however, the project will nevertheless be carried out in compliance with those laws.

# FEDERAL AUTHORIZING ACTIONS

AUTHORIZING ACTION	PROJECT ACTIVITY OR FACILITY REQUIRING THE ACTION	AUTHORIZING AGENCY	AUTHORITY
<u>LAND ACQUISITION</u>			
Relocation Benefits Plan	In the event homeowners are relocated as a result of the extension of the QD zones, a plan for relocation assistance will be developed.	None	Uniform Relocation Assistance and Real Property Acquisition Act, 42 U.S.C. § 4601 <u>et seq.</u>
<u>WATER</u>			
Section 404 (Dredge and Fill) Permit, Consultation	Discharge of dredged or fill material into waters of the United States at specified disposal sites, especially for impoundments and bridge crossing improvements on Crow and Diamond creeks on F.E. Warren AFB and where cable corridors traverse streams and wetlands.	Army Corps of Engineers, in con- sultation with Environmental Protection Agency and U.S. Fish and Wildlife Service	Federal Water Pollution Control Act of 1972, as amended, (FWPCA); § 404; 33 U.S.C. 1344; 33 C.F.R. 320-330; 40 C.F.R. 230. Executive Orders 11988 and 11990. Fish and Wildlife Coordination Act, 16 U.S.C. 661-666c.
Section 10 Permit	Construction of structures such as impoundments, bridge improvements, and cable com- ponents over any navigable water (e.g., Crow and Diamond creeks), the excava- tion from or depositing of material in such waters or any other work affecting the course, location, condition, or capacity of such waters.	Army Corps of Engineers, in con- sultation with Environmental Protection Agency and U.S. Fish and Wildlife Service.	Rivers and Harbors Act of 1899, § 10; 33 U.S.C. 403; 33 C.F.R. 320-330; 40 C.F.R. 230. Fish and Wildlife Coordination Act, 16 U.S.C. 661-666c.



# FEDERAL AUTHORIZING ACTIONS (continued)

AUTHORIZING ACTION	PROJECT ACTIVITY OR FACILITY REQUIRING THE ACTION	AUTHORIZING AGENCY	AUTHORITY
Approval of Spill Prevention Control and Counter-Measure Plan	Storage or transportation of oil (i.e., in the form of gasoline and diesel fuel or in any other form) at con- struction sites on and off F.E. Warren AFB and dispatch centers.	Environmental Protection Agency	FWPCA, 33 U.S.C. 1251 et seq. at § 1321 (j)(1)(c); 40 C.F.R. 112.
<u>AIR/NOISE</u>			
Consultation/ Abatement	Federal activities resulting in noise which EPA deter- mines to be a public nuisance or otherwise objectionable.	Environmental Protection Agency	Noise Pollution and Abatement Act of 1970 (Title IV, Clean Air Act, as amended); §§ 401-403.
<u>SOLID AND HAZARDOUS WASTE</u>			
Authority for short-term storage of small quantities of hazardous waste, hazardous waste I.D. number.	Generation during construc- tion and temporary storage of small quantities of haz- ardous waste including: expended or unusable oils and lubricants; machining fluids; cleaning agents and adhesives.	Environmental Protection Agency	Resource Conservation and Recovery act of 1976, 42 U.S.C. 6901 et seq.; at § 6921; 40 C.F.R. 261.5, 262.34.

# FEDERAL AUTHORIZING ACTIONS (continued)

AUTHORIZING ACTION	PROJECT ACTIVITY OR FACILITY REQUIRING THE ACTION	AUTHORIZING AGENCY	AUTHORITY
Registration, Packaging, and Manifest Requirements	Transportation of hazardous waste generated during construction from generation site to temporary storage site; transportation of propellants.	U.S. Department of Transportation	Hazardous Materials Transportation Act, 49 U.S.C. 1801 et seq.; Resource Conservation and Recovery Act of 1976, § 3003, 42 U.S.C. 6901 et seq.; 49 C.F.R. 170-179; <u>40 C.F.R. 262.30-262.33;</u> 45 Fed. Reg. 51645.
Approval of Safety Plan Generally and Facility-Specific Safety Plans	Storage and processing of explosives and propellants in the missile stage pro- cessing facility, Stage IV storage facility, and munici- pality supply storage facil- ity which are near inhabited buildings, public traffic routes, recreational facil- ities, utilities, petroleum storage facilities, or pro- cessing facilities for other explosives.	Department of Defense Explosive Safety Board	DoD Ammunition and Explosive Safety Standards Directive 5154.45; Air Force Regulation 127-100.

# FEDERAL AUTHORIZING ACTIONS (continued)

AUTHORIZING ACTION	PROJECT ACTIVITY OR FACILITY REQUIRING THE ACTION	AUTHORIZING AGENCY	AUTHORITY
<u>BIOLOGICAL RESOURCES</u>			
<u>PROTECTION</u>			
Consultation on Threatened and Endangered Species	Activities and facilities on F.E. Warren AFB and near existing silos which may affect the critical habitat of threatened or endangered species, e.g., the onbase improvements to stream crossings over Crow and Diamond creeks which may affect newly identified Colorado butterfly plant habitats and potential black-footed ferret habitat near silos and cables.	U.S. Fish and Wildlife Service	Endangered Species Act, (§ 7), 16 U.S.C. 1531 et seq., § 1536; 50 C.F.R. 402; Proposed Rules in 48 Fed. Reg. 29990.
Migratory Bird Treaty Act - Permits or appro- vals for movement of migratory birds.	In the event that the miti- gation plan for birds pro- tected under the Migratory Bird Treaty Act involves movement of birds, approval of the Secretary of the Interior may be required.	Department of Interior, Fish and Wildlife Service.	Migratory Bird and Treaty Act, 16 U.S.C. 703-711; 50 C.F.R. 21, et seq.

# FEDERAL AUTHORIZING ACTIONS (continued)

AUTHORIZING ACTION	PROJECT ACTIVITY OR FACILITY REQUIRING THE ACTION	AUTHORIZING AGENCY	AUTHORITY
<u>CULTURAL RESOURCE PROTECTION</u>			
Consultation and Comment	Project activities such as onbase construction and cable installation which affect property with his- toric, architectural, or cultural value that is listed or eligible for list- ing in the National Register of Historic Places, e.g., reuse and modifications of listed or eligible struc- tures located on F.E. Warren AFB and within the safety Quantity Distance.	Advisory Council on Historic Preservation	National Historic Preservation Act of 1966, as amended, 16 U.S.C. 470 et seq.; Executive Order 11593 "Protection and Enhancement of the Cultural Environment"; 36 C.F.R. 800; 36 C.F.R. 63; Proposed Programmatic Memorandum of Agreement between the Advisory Council and the U.S. Air Force.
<u>HIGHWAY IMPROVEMENTS</u>			
Highway Access Control Approval	Any construction involving new highway access improve- ments must be approved by the Secretary of Transportation.	Department of Transportation, Federal Highway Administration.	23 U.S.C. 111; 23 C.F.R. 712.

# WYOMING AUTHORIZING ACTIONS

AUTHORIZING ACTION	PROJECT ACTIVITY OR FACILITY REQUIRING THE ACTION	AUTHORIZING AGENCY	AUTHORITY
<u>AIR</u>			
Air Quality Permit	Project activities such as construction of new facilities onbase, Defense Access Road upgrade, cable installation, and such project facilities as standby power generation units which cause emission of or an increase in the emissions of air contaminants, especially fugitive dust.	Wyoming Department of Environmental Quality	Clean Air Act Amendments of 1977, 42 U.S.C. 7403 et seq.; W.S. 35-11-101 et seq.; and at 201-202; Wyoming Air Quality Standards and Regulations.
<u>WATER</u>			
National Pollution Discharge Elimination System Permit	Sump pump discharges at Launch Facilities, wastewater discharges at Launch Control Facilities, and any other discharge which may occur during construction or operation of the project.	Wyoming Department of Environmental Quality	FWPCA § 402, 33 U.S.C. 1251 et seq.; at § 1342; W.S. 35-11-101 et seq. at §§ 301-305; Wyoming Water Quality Rules and Regulations, Ch. II Discharge Permit Regulations.
401 Certification	Activities and facilities requiring Section 404 or Section 10 permits must obtain state certification that the discharge will comply with applicable effluent limitation and water quality standards.	Wyoming Department of Environmental Quality	FWPCA § 401, 33 U.S.C. 1341; 33 C.F.R. 320-330; 40 C.F.R. 121; W.S. 35-11-101 at §§ 301-305; Wyoming Water Quality Rules and Regulations.

# WYOMING AUTHORIZING ACTIONS (continued)

AUTHORIZING ACTION	PROJECT ACTIVITY OR FACILITY REQUIRING THE ACTION	AUTHORIZING AGENCY	AUTHORITY
Permit, Certificate of Appropriation, State Engineer Approval	Water rights acquisition; construction of wells, diversion structures and reservoirs.	Wyoming State Engineer and Board of Control	W.S. §§ 41-1-101 <u>et seq.</u>
<u>SOLID AND HAZARDOUS WASTE</u>			
Spill Prevention Control Plan Approval	Storage or transportation of oil (i.e., in the form of gasoline and diesel fuel or in any other form) at con- struction sites on and off F.E. Warren AFB and staging areas near navigable waters.	Environmental Protection Agency and Wyoming Department of Environmental Quality	FWPCA 33 U.S.C. 1251 <u>et seq.</u> at § 1321 (j)(a)(c); 40 C.F.R. 112; W.S. 35-11-101 <u>et seq.</u> ; Wyoming Spill Prevention Control Rules and Regulations.
Waste Site Permit	Establishing sites at stag- ing areas, Launch Facilities, and Launch Control Facilities for the disposal of solid construc- tion waste.	Wyoming Department of Environmental Quality	W.S. §§ 35-11-101 <u>et seq.</u> ; Wyoming Solid Waste Rules and Regulations.
<u>CULTURAL RESOURCES PROTECTION</u>			
Cultural Resource Clearance Permit	Construction of cable and Defense Access Road upgrade which will affect cultural and archaeological resources on state lands.	State Historic Preservation Office, Wyoming State Board of Land Commissioners	W.S. §§ 36-1-114-116; 36-4- 101; 36-4-106 (d).

# NEBRASKA AUTHORIZING ACTIONS

AUTHORIZING ACTION	PROJECT ACTIVITY OR FACILITY REQUIRING THE ACTION	AUTHORIZING AGENCY	AUTHORITY
<u>AIR</u>			
Air Quality Permit	Project activities such as construction of Defense Access Road upgrades and cable installation which cause emission of or an increase in emissions of air contaminants.	Nebraska Department of Environmental Control	Clean Air Act, as amended, 42 U.S.C. 7401 et seq.; N.R.S. § 81-1506; Nebraska Air pollution Control Rules and Regulations; NDEC Rules of Practice and Procedure.
<u>WATER</u>			
National Pollution Discharge Elimination System Permit	Sump pump discharges at Launch Facilities, wastewater discharges at Launch Control Facilities, and any other discharge which may occur during construction or operation of the project.	Nebraska Department of Environmental Control	FWPCA § 402, 33 U.S.C. 1251 et seq., at § 1342; 40 C.F.R. 52.21, 124; N.R.S. § 81-1506; Nebraska NPDES Regulations.
401 Certification	Activities and facilities requiring Section 404 or Section 10 permits must obtain state certification that the discharge will comply with applicable effluent limitations and water quality standards.	Nebraska Department of Environmental Control	FWPCA § 401, 33 U.S.C. 1341; 33 C.F.R. 320-330; 40 C.F.R. 121; N.R.S. § 81-1506; Nebraska Water Quality Standards.
Permit, Notification	Water rights acquisition for project construction and operation.	Nebraska Department of Water Resources	Nebraska Ground Water Management Act, N.R.S. §§ 46-2-1 et seq.; §§ 46-656 et seq.

# NEBRASKA AUTHORIZING ACTIONS (continued)

AUTHORIZING ACTION	PROJECT ACTIVITY OR FACILITY REQUIRING THE ACTION	AUTHORIZING AGENCY	AUTHORITY
<u>SOLID AND HAZARDOUS WASTE</u>			
Waste Site Permit	Establishing sites at stag- ing areas, Launch Facilities, and Launch Control Facilities for the disposal of solid construc- tion waste.	Nebraska Department of Environmental Control	Nebraska Litter Reduction and Recycling Act, N.R.S. §§ 81-1534-1566; Nebraska Solid Waste Management Rules.
<u>CULTURAL RESOURCES PROTECTION</u>			
Consultation	Construction of Defense Access Road Upgrades and cable installation which may affect cultural resources.	Nebraska State Historic Preservation Office, State Historical Society	N.R.S. §§ 82-118 et seq.
<u>OTHER</u>			
Overweight and Overdimensional Vehicles Permit	Transporter erector and stage transporter vehicles operation on state highways.	Nebraska Department of Roads	N.R.S. §§ 39-6177 et seq.; § 84-907; Rules and Regulations of the State of Nebraska Department of Roads pertaining to Permits for the Movement of Overweight and Overdimensional Vehicles or Loads.



## **APPENDIX F**

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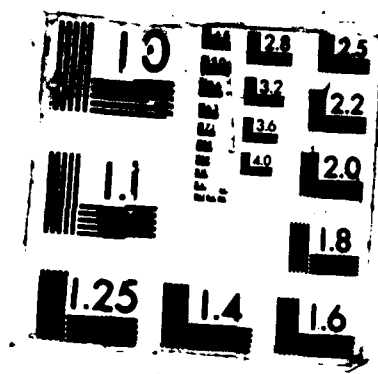
FINAL ENVIRONMENTAL IMPACT STATEMENT PEACEKEEPER IN  
MINUTEMAN SILOS FE WARREN AFB WYOMING VOLUME 1(U) AIR  
FORCE REGIONAL CIVIL ENGINEER-MX NORTON AFB CA JAN 84  
F/G 16/1

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